

## MIND

A QUARTERLY REVIEW

OF

PSYCHOLOGY AND PHILOSOPHY.

I.—LOTZE'S ANTITHESIS BETWEEN THOUGHT  
AND THINGS. I.

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It is easier to quote Lotze than to criticise him. His philosophy is composed of so many heterogeneous ingredients and has so many side issues at stake, that it presents the appearance of administering to every recognised cult in turn, from teleological Idealism to scientific Materialism, about equal shares of favour and abuse. Were a collection made of isolated passages which one theory or another might adduce in its support, it would appear that Lotze's writings were a hopeless sea of contradictions. But it would be obviously unfair to form an estimate of Lotze's worth in this piecemeal fashion. His admirers have naturally preferred to dwell on the consistency of his general line of thought and to exhibit the attractiveness of the ultimate aims and aspirations which undoubtedly exercise a dominating influence over all the details of his speculations. There is yet a third method of treatment, to which Lotze has been subjected by those of his enemies who regard themselves as staunch Idealists of the "absolute" type; they have simply ignored him. With feelings of impatience and irritation they have dismissed him from their minds as a terrible example of the ways in which philosophy can be misunder-

stood. Even Lotze's lifelong efforts to officiate as the peacemaker between philosophies they regard with contempt, under the impression that his achievements in this vocation are rather of the literary and forensic kind, which blows hot and cold with the same breath, than possessed of any healing virtue to permanently close the ruptures between opposing schools. In fact they do not want peace but war, and hope to find in their own Hegelian theory a signal example of the survival of the fittest.

But neither by picking holes in a man nor by praising him can we form an unbiased judgment of his worth. And Lotze is too important to be ignored. It may be fairly claimed that, in pure philosophy, he is the last in the field; he has pronounced his verdict upon all the most important problems of speculation; and so wide is the respect he commands that, as long as his words are allowed to remain the last, they will continue to gain acceptance as final. His attitude towards other German thinkers is most precisely described by von Hartmann in his *Lotze's Philosophie*. In that book he shows that it was Lotze's object, by a reconstruction of Herbart, to arrive at a higher point of view from which the elements of truth in Hegel and in Herbart might be blended into one harmonious whole, always provided that this point of view should be consistent with the spirit of Weisse. If students of Lotze would take up this hint of von Hartmann's and bear well in mind the influence of Weisse, they would possibly understand better what Idealism, with Lotze, really means. But in England, at any rate, the niceties of Lotze's position relative to the immediate philosophical atmosphere with which he was surrounded do not excite much concern; attention is confined to the broad and permanent outlines of his thought, which mark the culminating point of the reaction, led by Idealists with a partiality for "common-sense" and science, against extreme Hegelianism. Most of our recent metaphysicians bear strong marks of his influence, and he is also gaining in favour and importance among that class of religious speculators who view with apprehension the latest and boldest interpretations of Hegel. For ultra-Hegelianism is bound, in the first instance, to assume a negative attitude towards many of the cherished convictions of religious minds; and, until it convinces people that it can provide a positive philosophy of religion which shall be adequate to religious needs—a task in which it has not succeeded as yet—there are strong temptations for sober-minded men to throw in their lot with Lotze, the able champion of Christianity who can

do battle with Hegel and Herbart on their own grounds, and yet contrive at the end of the day to bring in victorious the more characteristic tenets of orthodoxy. If, therefore, Hegelians wish to check these desertions from their camp, they ought to take action; if they do not wish their silence to be misunderstood, they ought to clear away those misunderstandings of philosophy to which they think Lotze gives rise.

The final goal to which Lotze's thoughts are always directed is well known and much admired, and the many grounds on which its attainment is desirable are set forth with great persuasiveness and plausibility in the *Microcosmus*. But I think it is the first duty of criticism to examine the methods by which this consummation is to be reached and demonstrated as true; and for this purpose his later works on Logic and Metaphysic are the most important. One of the dominating notions, or at least the pervading perplexity, which is especially prominent herein is the belief in a relation or antithesis (or both) between thought and things. It is to be noted however that the importance, and at the same time the difficulty, of this antithesis lies in the fact that it is impossible to lay our finger on any particular chapter of Lotze's (as could be done, *e.g.*, with regard to his views on space) and say "here is his theory on the subject"; he does not make it a special problem; it is rather a vein of thought, permeating the entire body of his metaphysical theories, and, to a large extent, supplying the principle on which their vitality depends. Accordingly, although his Theory of Knowledge in *Logic*, bk. iii., is the *locus classicus* on the matter, in order to appreciate its import and seek its full justification we must often go further afield.

If we would fix upon the starting-point from which the antithesis developed in Lotze's mind, I think we must find it in his steady conviction that philosophy is, in the last resort, tentative, and is debarred by the frailty of human knowledge from the possibility of arriving at absolute certainty.

I readily admit that I take philosophy to be throughout merely an inner movement of the human spirit. In the history of that spirit alone has philosophy its history. It is an effort, within the presupposed limits, even to ourselves absolutely unknown, which our earthly existence imposes on us, to gain a consistent view of the world. . . . An absolute truth, such as the archangels in heaven would have to accept, is not its object.

This passage (*Met.*, bk. i. ch. vii.), which is typical of many, throws a strong light on the characteristic bent of

Lotze's mind. It betrays at once his recognition of the finite and human aspect of knowledge and also his firm conviction that this is not the whole of the matter, that there is a sense in which knowledge and reality must be held to be infinite and divine. I shall try to show later on that Lotze has made a fatal mistake and caused endless confusion by not clearing away the ambiguity, involved in the above view, at the outset, by giving a frank theory of the relation of the finite to the Infinite mind. At present we must simply note that his logical and metaphysical speculations suffer from the absence of some such theory; they are pervaded with an unanalysed feeling of uncertainty and of submission to a higher power, due to a reluctance to close with this ultimate but fundamental problem, while yet recognising its presence. He is firmly convinced of the existence of a true Reality, but seriously doubts whether our human minds are capable of cognising it.

We can now understand his attitude when first entering into the problems of speculation in *Logic*, bk. iii. He there disclaims all pretensions to the omniscience which alone could accomplish the consummation of philosophy as a "perfected system of connected truths at once ultimate and concrete". His less ambitious object, at the outset, is "not to inquire into the content of the principles in question, but into the grounds on which in a subjective sense their certainty for us reposes" (p. 412). He realises that the facts of human cognition, such as it is, are all the immediate data we have to work upon; he therefore resolves to make the best of them, and consequently opens his inquiry with an examination of "ideas," in which all the contents of our knowledge must take shape. He does not however think it necessary to preface his investigations with an examination into the extent and manner in which an object depends for its reality on its relation to a mind; he only recognises the very obvious, not to say trivial, fact that the reality of an object is not constituted by its relation to any particular mind, and thereupon makes bold to treat the reality of ideas as though it had nothing to do with the reality of objects. He asks us to concede his very plausible postulate that, whatever reality there may be behind our ideas, it is always in the first instance with "mere ideas" that we have to deal.

Of course if "idea" simply = "that which we know," every one will concede Lotze's postulate, but a moment's consideration will show that, on this interpretation, the postulate is quite barren and tautologous. We are thus naturally led to ask: Does not Lotze import some additional meaning



into the term "idea"? I think every one who reads him must perceive that he does. He constantly adopts that "common-sense" usage of "idea," by which the term is taken to mean a representation, true or false, of an object; a "mere idea" being a representation to which no object corresponds, or a representation considered apart from its object. Instances of this popular language occur on almost every page of his. We hear of objects "corresponding" or "not corresponding" with conceptions, of things being "more than" thoughts, of "the possible," *i.e.*, the world of conceptions, being "wider than" the real, of "things" with no "counterpart" in thought, and thoughts with no "counterpart" in things. Such modes of expression are full of metaphysical assumptions, the prevailing one being that thought is a subjective and formal activity directed against an alien world of objects. It is not necessary now to examine these assumptions in detail or inquire how far they implicate Lotze in the errors of the Formal Logicians. The point is that they *are* assumptions which Lotze does not attempt to prove. Unconscious apparently of any prejudices which they may involve, he imports them bodily, now under one guise and now under another, into that originally empty and tautologous statement "we know only ideas". Indeed, this last step is absolutely necessary for him; otherwise, his proposal to "begin with ideas" would not have told him where to begin at all; now, indeed, he has obtained a very definite starting-point, but it is at the cost of converting his primary postulate into an assumption which many metaphysicians would be far from conceding to him. I think it is not unfair to say that this assumption amounts to a demand that the mind's ideas shall be grouped into a sort of picture-gallery, round which it is necessary to make a tour of inspection and comparison before it is possible to ask whether the pictures correspond to the objects of real nature from which they are taken.

It would be highly unjust to charge Lotze with deliberately attempting to conceal the need for a metaphysical justification of his postulate. On the contrary, he informs us with inimitable coolness and good faith that his assumption is the necessary basis for every possible metaphysic. It is the one stable fact of the theory of cognition on which Idealists and Realists must find common ground. Thus he says, on p. 421:—

All we know of the external world depends upon the ideas of it which are within us; it is so far entirely indifferent whether with Idealism we deny the existence of that world, and regard our ideas of it as alone

reality, or whether we maintain with Realism the existence of things outside us which act upon our minds. On the latter hypothesis as little as the former do the things themselves pass into our knowledge ; they only awoken in us Ideas, which are not things.

Lotze regards the impartiality of the above doctrine as a sure guarantee for its fairness. It is intended to be a sign-post erected, on common ground, at the parting of the ways towards Idealism and Realism. And what exactly is the "common ground"? It is the belief, to quote Lotze's words, that "knowledge under whatever form can never be things in themselves, but only represent them". Far from regarding this proposition as at all ambiguous or dangerous, he holds it to be the statement of a primary fact on which "thought is perfectly clear, and at one with itself". The reason of Lotze's confidence is easy to explain. In his anxiety to find a common point of agreement between Idealism and Realism, he asks us to choose one of two alternative propositions, *viz.* : (1) Knowledge *is* things-in-themselves : (2) Knowledge *only represents* things-in-themselves. Naturally every one, be he inclined to Idealism or Realism, will decide to adopt proposition (2), *always provided that we are compelled to choose either the one or the other*. Now Lotze makes another step which should be taken in close connexion with the above. He makes another assumption which he holds must be equally acceptable to all, *viz.*, that knowledge must *at least represent* things. Here, again, in order that this second assumption may be conceded, he thinks it is only necessary to ask us to make our choice between the alternatives—(1) thought does not represent things in any way ; (2) thought *at least represents* things. Here, too, it is easy to persuade every one that they must accept proposition (2), *always provided that we are compelled to choose either the one or the other*. I wish to lay particular stress on the fact that the conditions I have italicised are ignored by Lotze, and tacitly assumed to be accepted ; I hope to show in the sequel that the supposition that they are binding is one of Lotze's most fatal mistakes.

The significance for him of the above view as to the representative character of knowledge cannot be over-estimated. It at once provides the justification for his Metaphysic, and furnishes ready to hand its immediate problem. For if thought does bring us reports from an external world of real things, a science of Metaphysic is possible, and it is the first business of that science to collect all the data which thought can furnish in answer to the question—"What is a thing?"

The actual steps by which Lotze's theory develops itself are as follows: Knowledge must in some way be representative, but we do not yet know in what way. We must, therefore, disclaim complicity with two prejudices which are equally liable to obtrude themselves in the phrase, "we know only phenomena". We must, in the first place, steer clear of the unwarranted presupposition that thought is, by its limitation to phenomena, thwarted in its purpose, or fails to penetrate to a real essence of things which exists in the grandeur of inaccessible solitude behind phenomena. To keep our minds free from bias, we must, in the second place, take note that there is another supposition equally possible and equally unproven. "We may at once pronounce an opposite point of view to be conceivable, which should regard things as mere means to produce in us in all its details the spectacle of the ideal world" (*Logic*, p. 431). It must be carefully noted here that in the passage from which this last quotation has been made, Lotze in no way modifies his view, as we have previously sketched it, of the representative character of knowledge. He does not deny that knowledge is representative; he does not even deny that it is representative of the unknowable; he only admits the difficulty of knowing the unknowable.

This last difficulty is made by Lotze the occasion for a new departure. He is not at all disconcerted by the discovery that he has made his "ideas" representative of something which he does not know. On the contrary, he seizes on the fact with avidity, and labelling it with the name "circle of ideas," makes immense capital out of it. For, if knowledge is only directly concerned with ideas within this circle, we have every right to neglect for the time being ugly questions about the relation of thought to an external reality, and not only can, but must, confine ourselves to the data which this circle of mere ideas provides. "Let us leave entirely out of the question the opposition between our world of ideas and a world of things; let us look upon the former alone as the material we have to deal with" (pp. 431-2). And so, after rehabilitating the Platonic world of ideas, Lotze proposes to take up the problem where Plato left it, and discover "what are those first principles of our knowledge under which the manifold world of Ideas has itself to be arranged" (p. 449). Thereupon the candour of Lotze prominently asserts itself. Fully convinced that the contents of knowledge are limited to a "circle of ideas," he wishes every one to take note of the fact; he calls upon us deliberately to watch him as he

"perpetrates" his surrender to the circle "with his eyes open".

The circle is inevitable, so we had better perpetrate it with our eyes open; the first thing we have to do is to endeavour to establish what meaning it is possible for us to attach to knowledge in its widest sense, and what sort of relation we can conceive to subsist between the subject which knows, and the object of its knowledge, consistently with those yet more general notions which determine the mode in which we have to conceive the operation of anything whatever upon anything else. What we have to do is to obtain the last-mentioned conception, which amounts to a metaphysical doctrine, and to treat the relation of subject and object as subordinate to it (p. 451).

This passage is highly important as indicating the direction in which Lotze is driven by his doctrine with regard to the limitation of knowledge to ideas. He becomes aware of the deficiency of that doctrine, and strives to supplement it by supplying to the essentially subjective aspect of "ideas" a more stable objectivity. Still, since knowledge is limited to "ideas," this "something more" ought, strictly, to be unknowable. It is an unknown, however, which plays such an important part that we cannot get along without taking it into account; so Lotze ingeniously proposes that, as we cannot *know* it, we must make an *assumption* or *postulate* as to what it would be like if we could know it. In this way "real things" cease to stand in an external relation to the circle of ideas; it is rather the reference of things to ideas and ideas to things which itself constitutes that circle. The assumption made, he invests it with the title "metaphysical," and erects it into the guiding principle which shall show us, as though by a miraculous intervention, how to "perpetrate" the circle of ideas. To this principle all logical inquiry must conform.

This leads us to ask, how far, and with what justification, does Lotze subordinate logic to metaphysic? Let us recollect the meaning of his terms. With him logic = the science of ideas, as opposed to metaphysic, which = the science of "things". He is not, be it remembered, attempting a regress to the grounds upon which the antithesis "thought *v.* things" is based; such a task would be equally logical and metaphysical. On what, then, does the priority of his "metaphysical assumptions" rest? In the first place, it cannot rest on their supposed reference to a Real beyond thought. For, although they be assumptions *about* that Real, they are yet out and out assumptions *of* thought; it is as thoughts alone, *i.e.*, solely in virtue of their place as members of the ideal world, that they must establish their

truth. He has told us at the beginning of bk. iii. of the *Logic* that "Truth and the knowledge of truth consist only in the laws of interconnexion which are found to obtain universally within a given set of ideas". Accordingly the supreme authority of his "metaphysical" assumptions over the circle of ideas cannot be delegated to them by an unknown power beyond that circle; it must consist of their recognised *ideal* supremacy, within the circle, over all other members of the circle. But can the "metaphysical" doctrine which is to regulate the circle of ideas stand this test? If its mysterious title "metaphysical" be ruled out of order, what special claim to sovereignty does the "law of the operation of anything whatever upon anything else" possess? Well, let us first try to understand Lotze's attitude on the subject.

Eager as Lotze is in his theory of knowledge to begin with "mere ideas" taken apart from their objects, he soon reminds us that he has a still more deeply rooted affection for "things". While professedly confining his attention to ideas, at least, we might have expected him to admit that the dominating laws of his subject-matter are those imposed by that mind to which the ideas owe their genesis; but, despite inconsistencies, he is found asserting at all hazards the pre-eminence of "things" even here. Why he should do so it is difficult to say, for he vouchsafes no explanation. I can only suggest that he has lapsed into a very plausible prejudice of "common-sense". It is a step which, however it be accounted for, is sadly mischievous in its results. His most confusing utterances on the theory of ideas are prompted by this latent assumption that "things" (whatever they may be), in virtue of their properties, produce modifications, *i.e.*, thoughts, in the cognising subject. He thinks we can treat the relation of thought to its object as a particular case to be dealt with by an application of the general laws of cause and effect. He, of course, avoids those coarser applications of these laws which figure in the pages of "scientific" philosophers; the way he utilises them is much more refined. (I shall mention some of these refinements when I come to deal with his use of the term "super-sensuous".) Still the qualifications and safeguards with which he supplements it do not affect the fundamental import of his metaphysical belief in the causative action of "things". Some such belief obtrudes itself, in a variety of guises, on almost every page. It is a notion almost as characteristic of Lotze as "thought-relations" are characteristic of Green. Indeed, we might say that the root-conception from which Lotze's system of philosophical

argumentation has sprung is the assumption that some external objective reality distinct from human thought exercises a causative action on our minds.

It is characteristic of Lotze always to face his difficulties boldly, until he has explained them away; they never induce him to turn back and reconsider his starting-point. It is now our business to note some of the complications in which he is involved by the assumption of an active causality on the part of things in themselves, and to trace the devices by which he endeavours to extricate himself from his embarrassments. He has laid himself open to the charge—to put it in the grossest form—of making consciousness, which can never be anything but the subject for which objects are, into an object; for it is only objects which can stand in the relation of cause and effect. I am quite ready to acknowledge that in many passages he rises superior to this debased view of consciousness, allowing that it is something altogether unique, and admitting, implicitly, its superiority over the categories of cause and effect. (I do not allude to Lotze's ascription to consciousness of a supposed indeterministic "freedom".) But the fact remains that, instead of discarding utterly the notion that consciousness is a passive thing, he tries to patch it up, as though any amount of patching up would make what is radically wrong right.

His first concession with a view to rectifying his mistake is that thought is, in part, constitutive of knowledge; the reason being that *each* of two objects which act on one another contributes from its own nature to the resultant effect. His meaning is made apparent at the point where (p. 456), after puzzling over the "innate ideas" of Descartes, he finds the solution of that problem must be prefaced by a deliberate "assumption as to the mode in which the object of knowledge may be conceived as operating upon the subject which apprehends it". By his own chosen assumption, which amounts to a rough doctrine of causality amongst natural phenomena, thought comes under the rule that "every object is receptive of various kinds of stimuli to its spontaneity". He then goes on to show that in the resultant effect, *i.e.*, the thought-content, the particular nature of the spontaneity of thought must be taken into account.

But subsequently Lotze makes a second and still greater concession to the importance of the work of thought. Thought always puts its own colour on objects given to it; but, in some cases, it does more; it makes its own objects entirely out of its own nature. The experience of the mind is

thus of two kinds according as it is (1) made out of material which thought does not make, or (2) made out of material which thought does make entirely out of itself. Which, with Lotze, amounts to saying that thought is not only a reality *per se*, but can *per se* produce real results. "In an act of knowledge the direct contribution from the side of the object may be absent, but never that which is furnished by the subject's own nature" (p. 457). After the original "stimulus from without" thoughts may "have their source in the constitution of the mind alone".

Proceeding on these lines, Lotze half unconsciously permits himself to widen and widen the gap between thought and "things," until he gets on the one hand an hypostasised world of ideas and on the other an unknown world of "things". Once set in motion a "stimulus from without," he imagines that thought may call into being a whole world of "possible" ideas, the private property of the mind itself and distinctly independent of the world of material objects. I particularly wish to call the attention of Idealists to this last point, because I think it will enable them to see what sort of an Idealist Lotze really is. I would have them observe that his justification for his "ideal world" is based on a plausible endeavour to do justice to thought as one amongst other partially independent and partially causally interconnected objects. Is such a philosopher, I would ask them, a safe or a dangerous friend?

The importance of seriously considering this question is emphasised by the growing habit of accepting Lotze's conclusions without taking the trouble to carefully examine their source. That is what makes his influence on the philosophy of to-day such a serious matter. And he states his convictions with such a persuasive air. He coaxes men to agree with him, who never would agree with him if he tried to compel them. Indeed, if attractiveness were the only test of philosophic truth, he would stand easily first. And nowhere has he done more to popularise his views, among those who judge Idealism by its results rather than by its justifications, than in his brilliant chapter on the Platonic ideas. I allude especially to his division of Reality into three unique kinds, *viz.*, Events, which *occur*; Things, which *exist*; Thoughts, which are *valid*. There can be no doubt "validity" is a capital name to conjure with. Whether it really succeeds in conjuring away all the difficulties of Platonism I cannot stop to inquire. It is more important to notice that in Lotze's own work it renders the important service of reducing to a minimum the friction between factors



of his thought which would be otherwise incompatible with one another. And thus he eludes the rude dialectical force of mere partisan warfare, which, if left to itself, would have heightened the antagonism between thoughts and things until they destroyed each other, thereby proving the necessity for their reunion in a higher unity which transcends their differences. To the outside world "validity" comes as a message of peace, which looks so temptingly plausible that they are only too willing to accept it, without bothering their heads particularly as to what the dispute has been about. For there is no royal road to Idealism; and, after their first laborious efforts in the direction of that goal, people begin to feel dissatisfied; unused to the rarefied atmosphere, they imagine they have left solid ground behind them. Then comes the arch-tempter and whispers in their ear that Idealism is a very estimable thing in its way, only it has a little over-rated itself; let them but endorse this quite innocent division of Reality into three, for which they have the authority of Lotze—the most scrupulous and conscientious of philosophers—and all the dark riddles of philosophy shall be revealed to them. And those who swallow the bait remind us thenceforth unceasingly that "thoughts are not things," and under the spell of that pass-word all the difficulties of philosophy make way before them; and those of their former friends who still ascend to Idealism by the hard and narrow way they never cease to reproach with the taunt that they "have hypostasised an abstraction".

I have tried to indicate the groundwork of Lotze's theory of thought, in the belief that people would do well to pause before growing enthusiastic over his "world" of "really valid" thought-concepts, and soberly ask what is the basis upon which this attractive superstructure rests. But so far we have been taking a one-sided view of Lotze. That is the worst of philosophies in two pieces; they have to be inspected twice over. Lotze indeed seems anxious to save us the trouble by trying to weld the two pieces into one in his philosophy of religion. But perhaps it would be advisable to follow him more closely, without anticipating the general statements with which he concludes; let us see how far he avails himself of the advantages of Dualism before he rejects it.

He constantly sets thought in opposition, latent or explicit, to "things". It would be impossible, without unfairly suppressing his meaning, to take his doctrine of thought in isolation, because the *quasi*-independence of the other member of the antithesis is for ever asserting itself. That is why

Lotze is such a formidable opponent to attack. "Thought" is no sooner demolished than "things" gain the ascendancy in this mental see-saw, and shower upon us a host of additional reasons why neither term in the antithesis can be disturbed. Popular English writers have taken a leaf out of Lotze's book. They forbid the Idealist to hypostasise thought, because they have shown thought to be impotent by investing it with the inane independence of universal validity; then, when experience testifies to the presence of something other than the bare universal in the content of thought, they triumphantly exclaim: "Behold those Real things, quite other than thoughts, which your stupid hypostasised thought has left out of the account".

It is therefore now our business to examine those claims to be independent of thought which "things" put forth. Incidentally, I call attention to a preliminary embarrassment which is apt to throw Lotze's readers off their guard. He not unfrequently changes his antithesis between ideas and reality into an antithesis between our ideas and God. He says at the outset that he will not decide whether "things" or God lie at the back of our ideas; he takes the benefit of the doubt, together with the credit for impartiality in doing so. The immensity of the difference between God and "things" as a substratum to thought is obvious enough; but, as I hope to show that his application of the notion of the Deity in this connexion is one which cannot philosophically be allowed, I think the ambiguity about the substratum need not here disconcert us.

And now, to resume, we can boldly ask *why* are "things" more than thoughts? without being overawed by fear of the insinuation that we are asking Why is God more than man? Lotze's first answer is—because they account for a *posteriori* knowledge. "The *a priori* character, however, which we thus claim in so broad a sense for our knowledge, is only one side of the matter. If we regard all forms of sensible perception . . . as modes of manifestation innate in the mind, then and for that reason the ground for this or that particular application of them, one necessarily excluding the other, cannot possibly be found in the mind" (*Logic*, p. 460). At this point Lotze's procedure needs to be carefully observed, for he is preparing the way for the transition from logic to metaphysic. Let us recollect that Lotze never saw the necessity for beginning with an analysis of the conditions of knowledge and existence. We have already observed how he takes thought for granted without asking how thought is possible; we must now trace the growth of his complemen-

tary assumption that "things" exist, and observe how strongly and irrevocably that assumption has influenced his theories, long before he brings himself to deal with the question—What are the conditions of the existence of a "thing"?

The first step towards the transition is made when he observes, and rightly enough, that knowledge must have an *a posteriori* element. But, as such an element is excluded from his narrow and formal view of thought, it must be referred to an unknown outside thought. This is the germinal conception from which his elaborated doctrine of "things" takes its rise. For the justification of his procedure we must look to his chapter on the "Real and Formal Value of Logical Acts". The argument there turns on his view of the relation between the process and the result of reasoning; or, as he puts it, the question is—When have our thought-contents a Real significance and when are they the mere "scaffolding of thought"? The main conclusion of a long and intricate discussion is that, regarded as intermediary links in a chain of reasoning, thoughts are only formal, whereas the thoughts in which chains of reasoning terminate have, or ought to have, real objects corresponding to them. In support of this he shows that judgments and syllogisms cannot have a "Real" significance, because no real object could possibly correspond, *e.g.*, to a hypothetical judgment. To adopt the simile which Lotze works out at the end of the chapter, thought is a spectator travelling by "subjective" and "formal" routes to an "objective" and "real" hill-top. Different spectators may ascend by different paths, but the view from the summit is the same for all. Now Lotze expects us to read a good deal of meaning in this simile of his. Amongst other things, he expects us to concede that, although thought in virtue of its "formality" (p. 493) is always, as it were, in touch with objective reality, yet thought as the universal result or terminus (the summit) is to be distinguished from and not limited to thought as the particular or the subjective process (the arbitrarily chosen path). "Surely," I may be told, "that is a highly plausible request. What harm can there be in emphasising the very modest truth that the universal and the particular are not the same?" Wait a moment; turning to the next page we find the illustration of the difference between universals and particulars is not as innocent as it appears to be. Lotze there tells us that in his illustrations the difference between the "arbitrary path" and the "summit" is meant to serve as a "preliminary elucidation" of the diffe-

rence between logical and metaphysical reality. I am aware that he promptly observes: "It will be better to reserve for the *Metaphysic* the fuller discussion of this important point". Very good; let us not forget the "fuller discussion"; but above all let us not be hurried away before digesting the full importance of the step he has just taken.

I think that if chapter iv. of *Logic*, bk. iii., be carefully read, especially the last three pages, it will be seen that in the explanation of this last step from logic to metaphysic is to be found the key which enables Lotze and his followers to open out their metaphysical assumptions into a working theory. We saw a little while ago that the "*a posteriori* element" pointed in this direction, by demanding that logical ideas must be supplemented from some other source. But the "*a posteriori* element" is not enough for them, because they can only extort out of it a "datum" alien to thought; for anything they can show, this datum might be a flux of particulars; in which case "things," being void of permanent qualities, could not be the subject-matter of a theory. *It is therefore necessary to universalise "things,"* so that metaphysical attributes may be predicated of them; this is done in a most subtle manner in the chapter before us. Thought had previously been stripped of its concrete particularity, in order that "things" might be clothed with reality; now its universality is borrowed from it, in order that "things" may be invested with the only property which can make them cognisable.

It is on account of this conversion of "things" into concrete universals that Lotze is able to make his divorce between thought and "things" complete and yet not suicidal. He raises the two into independent entities, and reduces their connexion from an intrinsic unity to a parallelism. There are thus (1) thoughts to which no "things" correspond: (2) thoughts and "things" which correspond to or are parallel with one another: (3) "things" to which no thoughts correspond. (1) are the outcome of the theory of "mere ideas"; (2) owe their existence to the transference to "things" of those attributes of particularity and universality which, I take it, should belong to thoughts alone. We have now to deal with (3) *i.e.*, with "things" which presume to be "more than" thoughts, with the belief, as English writers express it, that "existence is one thing, knowledge is another".

Now is the time to turn to that "fuller discussion" in the *Metaphysic* to which Lotze referred us for an elucidation of his views. It is to be found on pp. 142-4. He is dealing

with the difference between relations between the contents of ideas and relations between "real objects" or "things". He finds that "if  $a$  and  $b$ " be "simply contents of possible ideas like red and yellow, straight and curved, then a relation between them exists only so far as we think it and by the act of our thinking it". It has existence and permanence "only in the sense of being an occurrence which will always repeat itself in our thinking in the same way under the same conditions". But let  $a$  and  $b$  indicate expressly Realities, Entities or "Things". Then, although thought can institute comparisons and relations between  $a$  and  $b$  as before, "it is not these relations that we have in view, if, in order to render intelligible a connexion of the things  $a$  and  $b$  which experience forces on our notice, we appeal to a relation  $C$ , which sometimes does, sometimes does not, obtain between  $a$  and  $b$ "; such an "objective relation  $C$ ," he goes on to say, "cannot be anything that takes place *between*  $a$  and  $b$ , because it is only thought which constitutes a 'between'". What, then, is it? Well, the upshot is: "That which we sought under this name of an objective relation between things can only subsist if it is more than mere relation, and if it subsists not between things but immediately in them as the mutual action which they exercise on each other and the mutual effects which they sustain from each other".

Possibly Lotze might have made the above remarks a little more lucid, but they contain two unmistakable and vitally important statements. They tell us that we know thoughts are more than "things," because we are presented with "*variable* relations  $C$ ," *i.e.*, because the facts of our experience *change*. They tell us that, as, on the one hand, thoughts owe their reality to their presence to a mind, so "things," on the other hand, owe *their* reality to their participation in a mutual interaction between each other. The elucidation of these two points ought, if we wish seriously to regard Lotze's philosophy as a *system*, to be placed at the forefront of his *Metaphysic*. For his philosophy cannot possibly be regarded as a systematic whole unless his *Metaphysic* can be seen to be connected with and necessarily to flow from his theory of knowledge. We must carefully keep in view the reasons *why* he is justified in saying, in the Introduction to his *Metaphysic*, that the problems of that volume centre about the fact of change, taking place amongst real things.

After having seen how the mind is compelled to seek a solution of these metaphysical problems, the next step

obviously is to ask: What then is meant by "things which change"? It must here be observed that Lotze is not very obliging towards his readers. For it is a long time before any explanation is forthcoming. He refers us, it is true, to our "common-sense," which never finds the slightest difficulty in deciding what is a "change" and what is a "thing". But we are now supposed to be dealing with philosophy, and I think I am well within the mark in saying that the philosophical meaning of "change" and "thing" is very far from being a matter of common consent. It is therefore Lotze's fault, and not ours, that we are compelled to turn towards the conclusion of his speculative theories for the explanation of those terms which he uses from the beginning. He tells us on p. 1 of the *Metaphysic* that "while predicable only by metaphor of anything that is merely object of thought, change completely dominates the whole range of reality". But that is to assume, without explaining, that we know what "change" and "reality" are, and, in particular, that we know in what respects they are more than "mere objects of thought". Nor again do we get any more light on the matter from his special chapter on "Becoming and Change". He there professes to tell us the precise difference between metaphysical "things" and thoughts (p. 78). In the world of ideas "the content of a truth *a* is indeed founded on that of another *b*, but, far from arising out of the annihilation of *b*, holds good along with it in eternal validity"; whereas, in the world of changeable things, "the reality of the new is not contained in the reality of the old. It presupposes the removal of that reality as the beginning of its own." Of course there is an obvious difference between a valid truth (*e.g.*, a proposition in Euclid) and an actual fact; but that does not help us in the slightest to understand the difference between a thought and a "thing," because a thought, too, is always an actual fact as the object of the mind which thinks it, and to that mind the *actuality* of a new thought always presupposes the removal of the actuality of the old. Surely it would be preposterous first to abstract a certain (and essential) characteristic (*viz.*, their actuality) from ideas, and then to say that their difference from "things" consists in their not possessing that very characteristic.

Although I cannot find in the *Ontology* any explanation why a "thing" should be more than or other than a thought, I think I can find the reason why no such explanation is there forthcoming. Throughout the first book of his *Metaphysic* Lotze seems happily oblivious of the fact that Change implies Time. But our views on the import, logical and

metaphysical, of Change must depend entirely on our theory of Time. The reasons why Lotze holds that Change draws the border-line between logic and metaphysic must be found, if anywhere, in his doctrine as to the relation of Time to the cognising mind, or, as it is generally, though somewhat misleadingly, put, as to the question of the subjectivity or objectivity of Time. His verdict is pronounced on pp. 264-5. "Time as a whole is without doubt merely a creation of our presentative intellect. It neither is permanent nor does it elapse. . . . But the lapse of events in time we do not eliminate from reality, and we regard it as a perfectly hopeless undertaking to regard even the idea of this lapse as an *a priori* merely subjective form of apprehension, which develops itself within a timeless reality in the consciousness of spiritual beings." In short he finds Time or succession to be transcendently real. I must point out that this discovery was practically a foregone conclusion, because he has, throughout the *Metaphysic* and in the theory of knowledge—in so far as that treatise borders on metaphysic—been already treating *change* as transcendently real. Are we then to charge Lotze with a huge *petitio principii*? Without answering that question, I must insist that, whether consciously or unconsciously, his justification for treating "things" as "more than" thoughts is not to be found until we reach his theory of Time. Here for the first time come to light the full reasons for his conviction that the Idealist, or, as he often calls it, the "subjective," view of "real things" is inadequate. Even in his doctrine of space, the existence of noumenal "things" is taken for granted rather than proved; it is only out of the dictum "succession is inseparable from reality" that he is able to form the bridge whereby the mind may pass from its own world of ideas to an outer world of things in themselves.

This view of Time, if it be tenable, constitutes the stronghold of Lotze's system. For if Time is to be our passport to things in themselves, we shall carry with us a host of advantages. Let us recollect that cause and effect differ from reason and consequence in that the former are in time, the latter are not. Now if the time-relationship is in any way applicable to "supersensuous" or "intelligible" "things," it at once becomes possible to invest those "things" with a causal activity. And that is why Lotze holds himself at liberty to disregard the warning of Kant that the categories of cause and effect are applicable only to phenomena.

No sooner has Lotze completed his vindication of the



"reality" of Time than he is seized with an uneasy foreboding that he has been committing himself to a doctrine incompatible with the ultimate goal of his philosophy. He keenly sympathises with "the efforts which are ever being renewed to include the real process of becoming within the compass of an abiding reality" (p. 269). Then he goes on to give a highly significant and characteristic hint of the direction which he considers those efforts ought to take. "They will not, however, attain their object, unless the reality, which is greater than our thought, vouchsafes us a Perception, which, by showing us the mode of solution, at the same time persuades us of the solubility of this riddle." It is to the philosophy of religion, he concludes, that we must look for help.

It would lead me too far afield to describe the way in which, in bk. ix. of the *Microcosmus* and in the *Dictated Portions of the Philosophy of Religion*, he strives, by his theory of the Deity, to render his Realism compatible with his Idealism. My special reason for making the last quotation is that it affords an excellent illustration of the way in which Lotze habitually falls back on "immediate perception" as a guarantee of the superiority of "real things" over human thoughts. I briefly note three leading types of these appeals. Often he appeals to perception (1) as giving assurance of actual fact. Thought is supposed to be a spider, spinning an unsubstantial web of ideas; only when the spider catches its fly, when the mind immediately perceives something, is it certain that the meshes of thought are attached to a concrete reality. In other passages he seems to make perception do duty for (2) a miraculous revelation of things in themselves. He defends his belief by an argument from analogy. As, for example, the union of Being and not-Being presented in Becoming would be held to be impossible or miraculous, were it not a matter of everyday perception, so, he holds, the unverified inexplicabilities of his own theories might, by a divine revelation or a deeper insight, be immediately perceived to be established truths. I have already quoted an example of the sort of revelation he desires (*Metaphysic*, p. 269). The fact that the desiderated perceptions are not forthcoming does not disturb his belief in their possibility or shake his confidence in immediacy; it only induces him to appeal to immediacy under a new aspect, *viz.*, (3) "faith". The best references are *Microcosmus*, bk. ix. pp. 660-3, and ch. i. of the *Dictated Portions of the Philosophy of Religion*. The ultimate questions of philosophy, he says, "only the new and

special faculty of Faith is competent to answer". He particularly relies on religious faith, as distinct from "scientific," to give assurances of "realities" and "facts". Thus, apart from knowledge originating in external experience and mediated by the senses, "there are also inner states which are available as data for the acquisition of truth".

I began this sketch by saying that the key to Lotze's attitude when entering on the problems of speculation is to be found in his confession of a "feeling of uncertainty," arising from religious grounds. I end it with the observation that for the ultimate justification for his views Lotze again resorts to religion—this time, however, as the guarantee for a "feeling of immediate certainty".

Having first endeavoured to understand the meaning and justification of Lotze's antithesis, I propose in my next article to discuss its value.

*(To be continued.)*

## II.—THE FESTAL ORIGIN OF HUMAN SPEECH.

By J. DONOVAN.

"WORDS are something," says Lamb, in his Chapter on Ears, "but to be exposed to an endless battery of mere sounds; to fill up sound with feelings, and strain ideas to keep pace with it . . . to invent extempore tragedies to answer to the vague gestures of an inexplicable rambling mime—these are the faint shadows of what I have undergone from a series of the ablest-executed pieces of this empty instrumental music."

Here is a reflexion of the gap which now exists between the sounds of music and the sounds of speech. But it could never have met the eyes of a modern ethnologist without awaking the thought that it was not always thus; for, on the contrary, the habits of music-making are found to have a closer connexion with speech, the lower down we go in the scale of human development. With the majority of modern scholars, no less than with Lamb, the connexion between measured sounds and speech is lost sight of after the "perpetual cycle of declensions, conjugations, syntaxes and prosodies" has ceased to revolve in their memories. And if it were kept in view, the measured sounds would not be thought of as belonging to music in any way. Certainly it might be remembered that (*est etiam in dicendo cantus obscurior*) "there is an obscure kind of singing in speech," and that *prosody* means "a singing accompanying the words," but for all that, words are one thing, and an endless battery of mere sounds is another. But see how the American Indian filled up sound with feeling and made ideas keep pace with it. "Long before it comes to his turn to utter his stave or part of the chant, his mind has been worked up to the most intense point of excitement. His imagination has pictured the enemy, the ambush and the onset, the victory and the bleeding victim writhing under his prowess. In thought he has already stamped him under foot, and torn off his reeking scalp. It would require strong and graphic language to give utterance, in the shape of a song, to all he has fancied, and sees and feels on the subject. Physical excitement has absorbed his energies. . . . The inspiring drum and mystic rattle communicate new energy

to every step, while they serve by the observation of the most exact time to concentrate his energy."<sup>1</sup>

In this, and in nearly every other report of aboriginal music-making, one meets with the opposite pole of Lamb's experience. Here there is an approach to madness from the very overflowing of thoughts and feelings. Here it is the battery of sounds that is something; and the words almost nothing. Aborigines are found uttering measured sounds with no meaning at all for hours;<sup>2</sup> sometimes, the sounds possess the meaning of a single word;<sup>3</sup> or, again, the meaning of a phrase.<sup>4</sup> But in every case the sounds appear able to fire the imagination with the deepest meanings.

Can this phenomenon be interpreted? Can it be made out why feeling and imagination gather around musical sounds and measured movements, the more freely, the lower is the stage of human development? This paper is written in the belief, and with the intention of showing, that it can.

It is well known that the conditions of feeling and activity out of which we find music growing, everywhere partake of a festal character. In their most exciting and animating forms these conditions belong to tribal glorification over the achievements of heroic ancestors or mythical gods; but there are scores of smaller inducements to festal excitement. Birth, age of puberty, marriage, death, the success of a hunting or marauding enterprise, in short, every event of life and nature which has awakened the reflexion that distinguishes man from brutes, is dwelt on through the means of festal excitement, and is thereby connected with the measured sounds and movements of aboriginal music.

Now what good were measured sounds amid the wild excitement of these festal players? They could bring no distinct messages to the mind, and certainly they brought no alcoholic fumes to the brain; although the behaviour of the festal players under their influence often bears the stamp of intoxication. What was there in measured sounds which could so well appeal to the savage nature that they are found to be deeply engrained in the habits of festal utterance and movement of every known tribe? Let us return to the Chapter on Ears.

<sup>1</sup> *Schoolcraft*, Ind. Trib. of N. America, pt. ii. p. 60.

<sup>2</sup> *Journ. Anthr. Inst.*, vol. xii. 392, xiii. 441, xiv. 306.

<sup>3</sup> *Ibid.*, vol. xii. 453; *Schoolcraft*, pt. i. 398.

<sup>4</sup> *Mem. de la Soc. Eth.*, vol. ii. pt. ii. 92; *Schoolcraft*, pt. iv. 71; *Kepel's Ind. Archipel.*, vol. ii. 164.

"To music it (the ear) cannot be passive. It will strive—mine at least will—spite of its inaptitude, to thrird the maze; like an unskilled eye painfully poring upon hieroglyphics. I have sat through an Italian Opera, till, for sheer pain and inexplicable anguish, I have rushed out into the noisiest places of the crowded streets, to solace myself with sounds, which I was not *obliged to follow*, and get rid of the distracting torment of endless, fruitless, barren attention!"

This passage tells the truth pitilessly; if one hates and curses them for doing so, musical sounds will, before and above all else, attract attention. And if one searched through a world of possibilities as to what could be the first impulse of making measured sounds, he would find no answer at once so simple and so satisfactory as that it was an impulse to attract and absorb the attention.

But what good was it to our festally excited ancestors to have their attention absorbed? We might refer to the Hindu Yogis who have found ecstatic delights in absorption; but they had reached a comparatively high stage of human development. We have to consider a horde of savages in the unknown time when they first began to form the habits of festal excitement. Now one of the mental characters that has given the savage the name "wild" in common with untamed animals, is the fearful, startful, and untrusting way in which he directs his attention to his surroundings. And whatever helped to absorb his attention would help to free the feelings, at the bottom of the festal excitement, from the small promptings of animal fears and appetites, and thereby increase, or at least sustain, the wild pleasures of the excitement. Therefore, if a horde once acquired the habit of festal excitement, they would have an inducement to bring regularity into the movements and sounds produced through the physical energy of the excitement. Without implying anything of the nature of conscious intention or choice, without implying that they possessed the power of speech, we may fairly assume they would be driven, at each revival of festal excitement, to feel out a way of making the sounds more and more absorbing.

Supposing that articulate speech is still only a possibility of the future, let us ask, what were the means in reach of the players for promoting the absorbing efficacy of the impressions coming from the play movements?

They could bring the movements of body, beats of sticks, stones, &c., and cries, into a more or less regular succession. But as we are at an exceedingly low stage of mental development, we must not imply either the will or the way

to make good sounding bodies, *i.e.*, musical instruments. We must fall upon the means which lie nearest to each player for making absorbing sounds, namely, their vocal organs. What a scope of variety and contrast lay in these! There were the various changes of stress consequent upon the most trifling jerk of body or of abdominal muscles; the changes of pitch and timbre consequent upon the modification of position in the vocal organs; and lastly, but most important of all, the varieties and contrasts of articulation which lay in the power of fauces, tongue, palate, teeth and lips.

If the unconsciously working impulse to find as much absorption as possible through successive auditory impressions is not a fiction, the conclusion is inevitable that articulation must result from it. And however poor were the first vague attempts to articulate the uttered cries, the progress of muscular skill in producing similar checks in succession would have the same impulse behind it as induced the articulation to begin. The muscles of the vocal apparatus would gradually habituate themselves to the easiest manner of checking the vocal sounds;<sup>1</sup> and the movement of lips toward each other, or of the tongue towards palate and teeth, would get educated to the production of the same checks, because their similarity for the ear would at first satisfy the dim, unconscious impulse to obtain absorbing elements of sensation in conjunction with the play excitement.

In asking what was the next step of development which an impulse like this could effect, we must not imply that it had already created any distinct consonantal articulation before it began to develop other modifications; for instance, those of pitch and stress. The principle which embodies this blind impulse gives us no permission to lay down a chronological order of development. On that account, in the above question, "next" only means "another" step. Again our ethnological facts will guide us. The facts about the rudest stages of festal play leave no room for guessing another important direction of development which sounds took to increase their attention-absorbing power. However poor, from a musical point of view, be the results of the beating of the rudest music-makers, they are found modifying some sound in the continuous succession; and they bring in this modification at more or less regular intervals

<sup>1</sup> Without regarding the fact as important evidence, it may be mentioned that savages are found checking the vocal sounds with their hands—"and his yells uttered quick, sharp, and cut off by the application of the hand to the mouth" (*Schoolcraft*, Ind. Trib., pt. ii. 60).

in the series—I mean the modification caused by an increase of stress in the blow struck. The dimmest expectation of this modified sound in the series would mean an advance in absorbing effectiveness; and this would ensure an effort to maintain the modification and make its recurrence regular. Beyond a succession of mere units of sound, there would now be a succession of groups; the regularly recurring modification marking each group of, say, two, three, or four sounds.

To produce a similar modification in the vocal utterance required only a jerk of the breath, and this means is found to be employed universally for the function of marking for the ear the accentual groups of speech-sounds.

It is not to be expected that phonetic decay, the clustering of consonants, the shifting of accents, and other inevitable results of the growth of the significant power of syllables, would leave extant many vestiges of this process of the origin of the articulations and stress accents of speech. But it is important to observe that ear-absorbing alliteration and reduplication<sup>1</sup> are most prevalent in the rudest stages of the development of speech; and with regard to the accent of stress, its ear-attracting function clings to it still. A moment's reflexion on our everyday speech will show that the accent of stress calls our attention most pointedly<sup>2</sup> to the most significant parts of words and sentences.

The notion that the rhythmical and poetical forms in traditional remnants of savage speech are witnesses of a higher stage of human development than that which exists among the savages now, is deeply rooted in popular habits of thinking, but not more deeply than in the views of special scholars. But if it is proved that the rhythmic mould of song is a direct outcome of unconscious attempts, on the part of a horde that had formed habits of festal play, to feel out a means of preserving or increasing the exciting pleasure of festal elation, then rhythmic forms may appear as witnesses of a lower stage of progress than any yet known to anthropological records, namely, the stage of the passage between brute and man.

Let us test the account which has already been given of

<sup>1</sup> Sir J. Lubbock calculates that in four European languages there are only two reduplicated words in a thousand, whilst in primitive languages, there are from 37 to 170 in a thousand.

<sup>2</sup> Heyse says: "It is a natural law that the more significant elements of our speech should be distinguished from the less significant by a stronger accentuation" (*System der Spr.*, 329; cf. Benloew, *Précis d'une Théorie des Rythmes*, p. 13; Humboldt, *Verschied. der Mensch. Spr.*, 1880, ii. 170; *Journ. Anthr. Inst.*, vi. 459).



the origin of rhythmic and articulate sounds, by asking, What course of development must the sounds have taken if they were originated and moulded by festal excitement? What was there to make them significant?

They would be most generally associated with the confused elements of sensation belonging to festal play. But to point towards the general emotional states associated with the vocal utterances gives no satisfaction while the question before us relates to the particular meanings which would be fixed upon the utterances. The question to be answered is: What particular sensations or perceptions would, by the strength of their interest to the excited festal players, force themselves first into prominence out of the confused excitement?

The more trouble we take in examining the ethnological facts bearing upon the habits belonging to festal excitement, the more likely we shall be to conclude that among all the events of life which find a sort of play-reflexion in festal habits, the actions of war preponderate immensely. The war-dance is the most prevalent of all imitated actions,<sup>1</sup> and the feelings manifested surpass those accompanying any other actions in their realistic wildness. Besides the guidance furnished by ethnological facts, natural history has always taught that no actions of any animals equal those of war in the wildness of the feelings they excite. As there can be little doubt that the actions of war were at the root of the earliest festal excitement; the perceptions of (1) captured enemies, living or dead; (2) their possessions, females, food, &c.; (3) slain comrades of the victors, must be considered first when we look for perceptions which would, by the strength of their interest to the excited players, force themselves into prominence out of the confused excitement. The hold of such objects upon the interest of all warlike animals, whether they are co-operative or not, makes it quite safe to suppose that any of them might come into prominent notice amid the festal excitement; and every moment during which such objects, connected as they are with the natural appetites of the

<sup>1</sup> Even the African Pigmies (the Akka) performed the war-dance most enthusiastically (Sveinfurth, *Heart of Africa*, p. 129). The predominance of the war song and dance long ago made Langsdorff (Washington Islands) and other travellers think that although many occasions besides war awoke the excitement of song and dance at the time of their observations, yet originally the aborigines only danced and sang on their return from war. And where war-dances are not customary it is generally known that they have been in the past. (See Crawford, *Hist. Ind. Archip.*, vol. i. p. 122.)

animal, could be dominated by the emotional strength of festal play, and kept, however dimly, in consciousness, without firing the train of passions natural to them, would mean the melting away of a link in the chain which held the animals below the possibility of human development. Before the festal habits obtained the sway which they hold in savage communities now, how often must the passions of the lower animal have flooded the yet narrow field of (destined) human consciousness, and turned the activities of festal habit into the old activities of animal life! Unquestionable vestiges of this struggle remain in the festal habits of savages, and in the early history of the festal habits of now civilised races. The realistic frenzy with which imitations of the movements of attack upon enemies, imitations of the passionate movements of wild animals, *i.e.*, sexual, &c., are performed, is certainly a result of the discharge of passions awakened amid the festal habits, through the nerve centres which rule the actual, appetite-appeasing movements. But as long as festal excitement could last, it remained the conquering element of feeling, and was able to draw all the energy of actual passion to promote its own inherent tendencies. Some terrible examples of the moulding of animal-appetites and passions to the tendencies of festal excitement exist in accounts of the sacrificial cruelties of early festal celebrations, and revolting examples of it in accounts of "phallic rites". At whatever stage the traditional racial habits of festal celebration began to acquire symbolic meanings in the minds of celebrants, there can be no doubt, I think, that (1) bloody, human sacrifices, (2) sacrifices of animals for food, and sacrificial feasts generally, (3) phallic rites, were in their origin the results of (1) the passion for slaying enemies, (2) the appetite for food, (3) sexual passion, being drawn into the fire of festal emotion.

While considering this colouring of festal excitement by particular animal passions, we must not lose sight of the absorbing elements of sensation, the regular movements of body, the rhythmic sounds of sticks and stones, the rhythmic and articulated cries. It is perhaps impossible to estimate too highly the value of this absorption for enabling the festal excitement to mould the natural passions according to its own tendencies, instead of being destroyed by them.

Besides the perceptions from captured objects of desire, it was inevitable that the great changes of nature which intimately affect all animal life, should at one time or other obtain prominence in festal excitement. How many

circumstances helpful in gaining a victory over enemies or wild animals, or conducive to the welfare of the horde in other ways apart from fighting or hunting, would be noticed occurring in connexion with the changes of light and darkness, summer heat and winter cold, the storms, the rising and falling of rivers, and fire ?

The answer to the question from which we set out, namely, What would be the history of the articulated sounds as they developed in their full rhythmic mould? may run as follows. They came into existence through the help they offered in preserving the elements of feeling belonging to festal play, and it is impossible that they should not go on with their function when the elements grew more distinct, and when the festal excitement was coloured by particular perceptions—now a slain leader, again captured booty; now the thunderstorm, again the bright moon. In the early history of articulate sounds they could make no meaning themselves, but they preserved and got intimately associated with the peculiar feelings and perceptions that came most prominently into the minds of the festal players during their excitement. Articulate sounds could impose no particular order upon the confused feelings and perceptions of festal play; they could only wait while they entered into the order imposed upon them by the player's wild imitation of actions, and then preserve them in that order. Articulated utterances, in short, merely took up the acted stories of deeds of glory which began in wild confusion when festal play first began, but gradually found order through the festal impulse to bring all the sensations and perceptions that asserted themselves repeatedly into the order peculiar to fighting, destroying, rapacious warriors.

These are the considerations which oblige us to run counter to the notion that song, or rhythmical and poetical forms, must be supervening embellishments of speech which imply a certain height of civilisation. We have tested the account given of the festal origin of rhythmic forms and articulations, by leaving sounds aside and following the inevitable course of cohesive order which would take place among the sensations and perceptions dominant during festal excitement; and we come to the very cohesive principle which holds together whatever ideas there are in aboriginal songs and myths, namely, the principle of action—generally the impulsive action of beings in whom the lowest animalistic impulses are mixed up with impulses of a human character. But it remains to be asked whether there was anything in the festal impulses that will account

for the power which rhythmical and articulate utterances acquired in marking the details or relations of the actions, for example, their relation to individuals.

In the accounts we possess of festal excitement in the lower stages of human development, it is marked by no impulse so universally as by the impulse to glorify the strength and prowess of the community through its prominent members, ancestral or living. How could it be otherwise with excitement which was made to gather up in itself all the wild communal feeling of a horde in actual war? If a horde that had begun to acquire the habits of festal excitement had in other respects only the intelligence of wolves or jackals, the excitement must in time give birth to and nourish a desire to assert at least one grammatical relation of an action of war, that is, its personal relation.

Whenever a powerful and bold fighter asserted himself in actual war, the seeds would be sown which must grow into a desire to assert this fighter and his prowess amid the excitement of future, festal imitations of the actions of war. Many circumstances, which must occur at some time or other, would favour the growth of this desire.

First may be mentioned the self-assertion of the strong individual. (It is a distinguishing characteristic of the savage hero to boast of his deeds during festal excitement. Nothing brings the character of Homeric heroes nearer to that of the leaders among contemporary savages than this personal assertion.)

(2) The absence of the brave fighter at the time of the festal excitement which followed his brave deeds.

(3) The presence of his dead body. (It is hardly necessary to point to the universal prevalence of funeral dances and sung praises of the dead hero.)

(4) The imitation of a particularly great feat of a strong individual by one or more of the players who saw it performed in the battle. Any of these occurrences would tend to force the image of a particular fighter into the consciousness of the excited players while it was occupied with the general conception of victorious battle, and thus make their emotion and its expression in imitated actions and vocal utterances, an acted song of individual praise.

When a dog rushes savagely upon another and passes other dogs on his way, he acts upon the principle, "that, not these," quite as efficiently as if he could utter an articulate sound expressing the grammatical relation. A ruffian in a passion might rush upon another man, and though he possesses the articulate material and the mind for marking

the personal relation of his intended action, it avails him not to do so; he may only growl like the dog. The animal instincts guide to their object as well without the material for marking personal relations as with it.

This is very obvious, but one who bears it in mind will better perceive the superiority of the festal impulse over any life-caring impulses in regard to creating the desire of marking the personal relations of an action—to say nothing about supplying the vocal material. Without the vestige of a conscious intention behind it, this impulse induced the players to dwell on some sort of an image of an individual in relation to the actions imitated, whilst rhythmical and articulate utterances were absorbing ear and mind, and, at the same time, getting fixed upon the perceptions which they were associated with repeatedly.

The fixing of the vocal utterances depended a great deal, perhaps, upon those who surrendered themselves most completely to the festal impulses. The impulses to realise the actions of the mighty members of their horde with all the detail possible, and to preserve the regularly recurring movements and utterances in their habitual order, would be followed with most zest by the specially clever actors and celebrants, the prototypes of medicine men, dancing dervises, shamans and yogis. The ecstatic results of the aural reverie or absorption would be felt most by these, and lead them to make the greatest efforts to furnish the sounds to sustain it. These would most keenly feel the disturbance caused when a group of syllables which had been associated repeatedly with one action was produced with another. The disturbance would consist of an interruption of the smooth absorption, and those who felt it most would try to avoid what caused it; that is to say, they would keep particular groups of syllables in regular connexion with particular actions, and thus, without any object besides the blind following of the pleasure of festal elation, they would be gradually endowing the syllables with meaning. I will try to illustrate by such syllables as are met with in savage choruses. But it must be remembered that in the earliest stages of the development of articulation, the syllables repeated were not like the syllables of a savage chorus as they are now known. If the syllables of a savage chorus were meaningless a century ago, the traveller might confidently expect to find them meaningless now. In fact it would be as great a wonder to find that they had acquired meaning, as it would be to find that the syllables *Fal-la-la*, or *Tira-lira!* &c., were now settled verbs or substantives, because they were used for

refrains in the middle ages. These syllables were not wanted for significance, for language was developed already.

The syllables whose history we have to follow were not sung by developed men in possession of other articulate syllables with conceptual meanings clinging to them and rendering them fit to mark any object they cared to mark. Suppose then, that, with no concept-bearing syllables in existence to compete with them—

(1) *Kín-wi-ki-kín-wi-ki-wá-ya-ya* are repeated during the wild festal imitation of the setting out of the hero and his horde, their passage over mountains and rivers, &c.

(2) *Gá-wan-ga-gá-wan-ga-wá-ya-ya* are repeated during the imitation of their coming in sight of enemies, attacking and destroying them.

(3) *Ví-ni-ka-ví-ni-ka-wá-ya-ya* are repeated during the imitation of the seizure of the enemies' possessions, eating, and otherwise satisfying appetites.

With each revival of the excitement of this festal play, the elements of feeling and imagined action must become more and more cohesive; they must become like a new instinct or habit, ready to flash into active sympathy in response to any impressions of nature akin to them. Thus, the vague groups of sensations held together by festal absorption in the actions of the strong fighter, as he fell upon enemies and destroyed them, must sometime be awakened into activity by the sight of a ravaging fire or the destructive overflowing of a river; and as sure as the group of dramatically cohesive sensations were awakened into activity, the articulate utterances, which were a part of them in the festal excitement, would accompany them. In this way, from being connected, as a sort of aural connecting bond, with the confused concept of *destroying*, *gáwanya* would become its vocal mark, and be uttered when any objects of nature gave impressions which could, however faintly, touch the spring of the latent mass of sensations belonging to the festal imagining of the destroying warrior. The same may be said of the syllables of the other two phrases in the illustration. A mass of sensations rendered slightly cohesive as a concept of *wandering forth* would be ready for sympathetic response to impressions conveyed by, say, a wandering herd of the quieter sort of animals, moving clouds, the sun or moon; and the syllables *kínwíki* would become their vocal sounding mark. A vague concept, which we would describe as *eating* or *enjoying*, would be ready for sympathetic response to impressions conveyed by, say, animals that were oftenest seen satisfying their appetites; and *vínika* would become their vocal mark.

It will be observed that there was plenty of time for any little affinities of impression to assert themselves in the consciousness of these festal players. For example, if the affinities between impressions of moving clouds and the cohesive group of sensations belonging to the festal imitation of the setting forth of warriors, did not assert themselves at once, or were vaguely felt and then lost again, the cohesive group would be still held together, ready for any favourable circumstances of the future. The festal impulses which drew the groups of sensations into cohesion did not depend in any way upon the progress in naming objects of nature which was made by the syllables connected with the different cohesive groups. The pleasures which created the festal habits sustained them by their first blind impulses, quite independently of this further turn of development; although in time the results of naming would enter into the heart of the festal excitement, and give it an impetus which it could never receive from the bare rhythmic sounds and movements. Then, the mere ear-absorbing sequences of sound would have to yield to the interests of significance.

It could never have given much satisfaction to a philologist with modern habits of mind to be told that he may begin his interpretations at the rudest possible stages of the development of speech, but he need not think of the problem of its origin, as that is the rubicon between brute and man. Ordinary scientific instincts must whisper to the philologist that the secret of origin would save enormous labours of plausible guessing about those early stages of development which he is allowed to grapple with. For instance, if he is invited to consider a root-period of development, a period of the acquisition of grammatical forms, and then a myth-making period, he might well feel that the problem of origin, like a tough weed that ought to have been cut down at the outset, has sent forth three branches each as vigorous and obstructive as itself.

Yet the masters of philology who have uttered cautions against the forming of opinions about origin had good grounds for doing so. As there was no evolutionistic view of origin which did not look to some kind of life-caring impulses, what use would such views be in face, say, of grammatical forms? What miracles would it require to bring the broken and separate cares of appetite and passion to establish these forms, even if the vocal material and the desire for marking grammatical relations were at hand, and nobody asked how appetite and passion could create them?



If festal habits had not been brought forward to account for the vocal signs of concepts of actions, the problem of the origin of grammatical forms would point directly to them, or rather to the euphonic aspects of them. One who merely glances over the grammatical forms of any primitive language, and observes the great euphonic variety of sounds elaborated out of a few simple elements, must be struck with the fact that a similar phenomenon is displayed by the art of music. In respect of rhythmic grouping, the similarity is complete; and the contrast and likeness between individual sounds and groups in speech display a strong musical impulse in "vocalic harmony," as well as in the contrasts and varieties of consonants. But the guidance offered by these exterior suggestions is of small value in comparison with that offered by a simple pursuance of the principle upon which the articulate sounds acquired meaning.

When particular syllables got fixed upon particular actions they would be brought up with them, and here two chief interests of the festal excitement would begin to clash, the interest of significance, and that belonging to the impulse to make the vocal apparatus produce the easiest possible enticements for the ear. As soon as a rudimentary significance was felt, that is to say, as soon as it was felt as wrong or disturbing to use any but a particular few syllables in connexion with the imitation of a particular action, these few syllables would be brought up with the action, whether or not their production at this moment disturbed the absorption of the ear. The impulse to utter sounds which would attract the ear most easily would be driven to make the best of it by the easy repetition of the syllables used to fill up the rhythmic phrase, after the occurrence of the significant syllables. This filling up of the rhythmic phrase is suggested by the syllables *wá-ya-ya* in the above illustration, if such an illustration is necessary for pointing out facts which are apparent in every stage of the progress of language. In the familiar observation of travellers about the "unmeaning interjections scattered here and there to assist the metre" of savage songs, as well as in the most polished alliterations, assonances, rhymes, refrains and burthens, there can be no doubt that we behold the demands for aural absorption trying to make their way among syllables which have been fixed by significance. Of course, in these later stages of development, we see the simply ear-attracting syllables driven out of the significant phrases altogether, and left to refrains. There could be neither room nor inclination for them among syllables which had

the full power of language. But in the earliest stages of development, when no significance clung to any syllables besides vague concepts of actions, the still meaningless syllables would fall thick about them and become a ready material for signifying the personal and temporal relations of the actions.

With regard to explaining the progress of significance, it would be an obvious mistake to look exclusively toward the working of the blind impulses of festal excitement. When we approach the use of grammatical tools we are certainly at the confines of what could be effected under these blind impulses. Indeed it is a question whether the rudest articulate fixing of concepts of actions would not assert the communicative utility of the syllables. If the sight of a lion touched the spring of the latent mass of perceptions made cohesive by the festal imitation of the destroying warrior, and caused even a fragmentary imitation of the action, and the utterance of a little group of the associated syllables (*i.e.*, *gawanga*), the utility of the fragmentary act or gesture and the utterance must begin to loom in consciousness, however dimly, and make their further use an affair of intention. I shall make no attempt to show how impulses of festal excitement came to blend with conscious endeavours to make distinctions of meaning, or what the results of the blending would be. But it might be shown that the syllables used blindly to fill up the rhythmic phrase after the occurrence of the few syllables which had acquired a fixed meaning were very apt for the marking of grammatical relations.

First, the nature of the problem of the origin of grammatical meanings should be made clear. The elements of the conceptual meanings of actions were held together by the bodily imitation of the actions ; but there were no imitated actions to create and combine the vague notion of a personal or temporal relation of many different actions, and fix it on a particular few syllables. What was there instead? The inevitable growth of a conscious effort to distinguish has been pointed out already. But how admirably the blind festal impulses were adapted to meet the conscious efforts half-way ! Let us take the fixing of a personal relation as an example.

It is hardly necessary to insist further on the reality of the festal impulse to dwell on the image of a prominent member of the horde during the excitement of the play imitation of the actions of war. The impulse that created headstones and other rudiments of sculpture is not a thing

of speculation. The same may be said of refrain-syllables in aboriginal songs, the syllables, namely, which are brought up unchanged for the mere attraction of the ear, for the filling up of rhythmic phrases after the occurrence of syllables of fixed meaning. At the stage of development which we are considering we have the meaning of different concepts of actions fixed upon different little groups of syllables; and it is obvious that so far as these syllables predicated the actions at all, they predicated them of the member or members of the horde whose image dominated the festal excitement. Now what could prevent some of the continually repeated refrain-syllables from fixing themselves gradually upon whatever vague desire existed to assert a demonstrative or pronominal notion? At any rate (and this is all that is claimed), the refrain-syllables would be a well-prepared grammatical material when a conscious effort to mark a personal relation came to be made. Because, just as the notion of the personal relation floated around successive and different actions, the auditory impression of these refrain-syllables floated around the successive, and different, action-predicating syllables.

The permanent use of one grammatical tool would mean the swift creation of the need of others; and the vocal material for them would be supplied in plenty always by the impulse to supply the articulate food for aural absorption.

One who holds this view of the origin of grammatical forms will, I think, see no impenetrable mystery in the wondrous regularity and euphonic adaptiveness of the grammatical forms of primitive languages; and with regard to cultured languages, it may be remarked that Prof. Sayce quotes late studies by Bergaigne and Meyer in support of his own conviction that a "thoroughgoing examination of the Aryan declension would show that its origin was similar to that of the Semitic noun, the cases being differentiated, as the need of them arose, out of various more or less unmeaning terminations".<sup>1</sup> And again, he says, "when the conception of a locative case, for example, first arose in the mind of the Aryan, he selected some formerly existing but hitherto meaningless suffixes to express the new relation, and so turned a mere phonetic complement, a mere formal sound, into a grammatical inflexion".

<sup>1</sup> *Princ. Comp. Phil.*, 3rd edit., p. 396.

### III.—THE LOGICAL CALCULUS. (III.)

By W. E. JOHNSON.

§ 1. In the two previous numbers of MIND, I gave a general view of the scope of logical symbolism. In the present article, I propose to exhibit the working of the calculus in greater detail. I must begin by recapitulating the points maintained in my first article. Logic is regarded as concerned primarily with the principles of propositional synthesis. In the first instance, then, literal symbols will be used to represent unanalysed propositions. The fundamental mode of synthesis—called *conjunction* par excellence—I take to be that indicated by the word *and*. This mode of conjunction will be simply symbolised by juxtaposition of the propositions conjoined. The fundamental relation between proposition and proposition—called *contradiction* or *negation*—is that indicated by the particle *not*. This particle will be represented by a *bar*, drawn over the proposition or conjunction of propositions to be contradicted. It should be explicitly stated at the outset that the negation or the conjunction of unambiguous propositions yields an unambiguous proposition. Hence the formulæ that hold for propositions in general hold for the negation and contradiction of propositions. The following are the formal universal laws of propositional synthesis, expressed by means of =, the symbol of equivalence:—

- I. The Commutative Law ;  $xy = yx$ .
- II. The Associative Law ;  $xy.z = x.yz$ .
- III. The Law of Tautology ;  $xx = x$ .
- IV. The Law of Reciprocity ;  $\bar{\bar{x}} = x$ .
- V. The Law of Dichotomy ;  $\bar{x} = xy \bar{xy}$ .

In the derivation of rules, it will be unnecessary to make explicit reference to the first two laws, as they have their equivalents in ordinary Algebra. The third law allows us to repeat, or to cancel the repetition, of any determinant. The fourth law is chiefly applied to give a reciprocal form to any equivalence. For instance, since  $x = \bar{\bar{x}}$ , the reciprocal form of the Law of Dichotomy is  $x = \bar{xy} \bar{xy}$ . The Law of Dichotomy itself, which is the chief instrument of the calculus, may be applied either to *resolve* any proposition into two determinants, or to *compound* a pair of determinants

into a single proposition. We shall use the terms *Resolution* and *Composition* in referring to these two applications of the law.

The omission of determinants will be indicated by the symbol . . . , as explained in my last paper. Hence the partial equivalence  $a = \dots c$  must be read: " $a$  contains  $c$  as a determinant". A proposition that denies a conjunctive will be called a *disjunctive*. Disjunctives are either *simple* or *complex*. A simple disjunctive is one that disjoins single letters or their contradictories, such as  $\overline{xy}$ ,  $xyz$ . A complex disjunctive is one that contains sub-disjunction; i.e., that disjoins a proposition that is itself a disjunctive, such as  $\overline{xyz}$ . In § 2, I shall deal with simple disjunctives, and in § 3 with complex disjunctives.

§ 2. *Rule of Elimination*:  $\overline{xa} \overline{xc} = \dots \overline{ac}$ .

For  $\overline{xa} = \overline{xac} \overline{xac}$  by Resolution;  
and  $\overline{xc} = \overline{xac} \overline{xac}$  by Resolution;  
but  $\overline{xac} \overline{xac} = \overline{ac}$  by Composition.

This shows that  $\overline{ac}$  is a determinant of the given combination; viz., the determinant from which  $x$  has been eliminated. The rule of elimination may be thus rendered: *Terms that are disjoined with  $x$  and with  $\overline{x}$  may be disjoined with one another*. By repeated application of this rule, we may eliminate  $x$  from a conjunction of any number of simple disjunctives. Thus:—

$$\overline{xa} \overline{xc} \overline{xe} \overline{xg} = \dots \overline{ac} \overline{ag} \overline{ce} \overline{eg}.$$

The derivation of such results requires—besides the commutative and associative laws—also the Law of Tautology. The required determinant is found by disjoining every term disjoined with  $x$  with every term disjoined with  $\overline{x}$ . Again, we may eliminate in the same way any number of terms,  $x$ ,  $y$ , &c. Thus:—

$$\overline{ax} \overline{cy} \overline{xy} = \dots \overline{ay} \overline{cy} = \dots \overline{ac}.$$

The derivation of the rule shows, moreover, what determinants have been omitted in arriving at the required determinant: viz., in the fundamental formula given above,  $\overline{xac} \overline{xac}$ . These, together with  $\overline{ac}$ , make up the full import of the original combination.

§ 3. In this section we shall show how any complex disjunctive may be resolved into simple disjunctives. To establish this we may first prove two minor rules of simplification:—

Rule of Inclusion :  $\bar{a}\bar{c} \bar{c} = \bar{c}$ .

For  $\bar{c} = \bar{a}\bar{c} \bar{a}\bar{c}$  by Resolution.

Hence the determinant  $\bar{a}\bar{c}$  in conjunction with  $\bar{c}$  is, by the Law of Tautology, superfluous. Writing  $\bar{c}$  for  $c$ , we obtain the reciprocal rule  $\bar{a}\bar{c} c = c$ .

Rule of Exclusion :  $\bar{a}\bar{c} c = \bar{a}\bar{c}$ .

For  $\bar{a}\bar{c} = \bar{a}\bar{c} \bar{a}\bar{c} c$  by Resolution of  $\bar{a}$ ,

$= \bar{a}\bar{c} c$  by Reci<sup>l</sup>. form of Inclusion.

Writing  $\bar{c}$  for  $c$ , we obtain the reciprocal rule  $\bar{a}\bar{c} \bar{c} = \bar{a} \bar{c}$ . By aid of these two subsidiary rules, we proceed to prove the

Rule of Distribution :  $\bar{a}\bar{a}\bar{c} = \bar{x}\bar{x} \bar{x}\bar{c}$ .

For  $\bar{x}\bar{x}\bar{c} = \bar{x}\bar{x}\bar{c} c \bar{x}\bar{x}\bar{c} \bar{c}$  by Resolution,

$= \bar{x}\bar{x}\bar{c} \bar{x}\bar{c}$  by Exc<sup>n</sup>. and Inc<sup>n</sup>.,

$= \bar{x}\bar{x}\bar{c} \bar{x}\bar{x}\bar{c} \bar{x}\bar{x}\bar{c}$  by Resolution,

$= \bar{x}\bar{x} \bar{x}\bar{c}$  by Taut<sup>y</sup>. and Comp<sup>n</sup>.

The Rule of Distribution thus enables us to get rid of all complex disjunction. Hence, after reducing any complex combination to a conjunction of simple disjunctives, we may apply the rule of elimination.

§ 4. *Interpretation of the Preceding Rules.* The advantage of deriving the rules in the above forms is that we may give a variety of different interpretations to each formula, and thus bring various logical processes under a common principle. We have only to interpret the disjunctive  $\bar{x}y$  in one or other of its four forms, viz., (1) If  $x$  then  $\bar{y}$ ; (2) If  $y$  then  $\bar{x}$ ; (3) Either  $\bar{x}$  or  $\bar{y}$ ; (4) Not-both  $x$  and  $y$ . Take, for example, the Rule of Exclusion, which may be written:—

$$(1) \bar{a}\bar{c}c = \dots a \quad (2) \bar{a}\bar{c}\bar{c} = \dots \bar{a}$$

$$(3) \bar{a}\bar{c}\bar{c} = \dots \bar{a} \quad (4) \bar{a}cc = \dots \bar{a}.$$

This rule gives the formula for any argument involving a hypothetical, alternative, or disjunctive combined with a categorical premiss. Thus:—

(1) If  $c$  then  $a$ , but  $c \therefore a$  (Ponendo Ponens).

(2) If  $a$  then  $c$ , but  $\bar{c} \therefore \bar{a}$  (Tollendo Tollens).

(3) Either  $a$  or  $c$ , but  $\bar{c} \therefore a$  (Tollendo Ponens).

(4) Not-both  $a$  and  $c$ , but  $c \therefore \bar{a}$  (Ponendo Tollens).<sup>1</sup>

<sup>1</sup> It is clear that the argument "Either  $a$  or  $c$ , but  $c \therefore$  not  $a$ " is only valid in so far as it rests on the *disjunction* of  $a$  and  $c$ , not on their *alter-*

Again, the Rule of Elimination contains the principle of the 'middle term' of syllogistic arguments. Thus:—

$$\overline{ax} \overline{xc} = \dots \overline{ac}$$

may be interpreted: "If  $a$  then  $x$ , and if  $x$  then  $c$ ;  $\therefore$  if  $a$  then  $c$ ," in the first figure. The same formula gives arguments in the other three figures, as well as equivalent arguments in alternative or disjunctive form. The arguments deduced from this are of the general nature of the *dilemma*. Thus the second result deduced above from the rule of elimination may be interpreted: "If  $a$  then  $x$  and if  $c$  then  $y$ ; but either not- $x$  or not- $y$ ;  $\therefore$  either not- $a$  or not- $c$ ".

I have given these elementary illustrations in order to show how the fundamental laws regulating pure synthesis and negation may be applied in building up arguments of gradually increasing complexity. It will be seen that a formally inferred conclusion is always a *formal determinant* of the premisses. And, if desired, we may introduce the omitted determinants which, with the conclusion, make up the full import of these premisses. Thus, in the syllogism of the first figure given above, the omitted determinants are  $\overline{xac} \overline{xac}$ , i.e., "If  $a$  and  $c$ , then  $x$ ; and If  $x$ , then  $a$  or  $c$ ".

§ 5. *The Constant of Propositional Synthesis.* In Algebra the symbols 1, 2, 3 . . . have constant values, as contrasted with the letter-symbols  $a, b, c$  . . . which may have different values in different contexts. Similarly, in Logic, we shall find that there is one form of proposition which (with its contradictory) has a constant propositional value. The theorem that expresses this principle is the

$$\text{Rule of Constancy: } a\overline{a} = c\overline{c}.$$

For  $a\overline{a} = \overline{ac} \overline{ac} \overline{ac} \overline{ac}$  by Resolution. And, since  $c\overline{c}$  may be similarly resolved into the same set of determinants differently grouped, we have  $a\overline{a} = c\overline{c}$ . In words: *Any conjunction of contradictories has the same propositional value*, and may, therefore, be always expressed by the same symbol. In order to avoid the numerical implications of the symbols 0 and 1, I shall use the Greek letters  $\phi$  and  $\tau$  to represent this constant and its contradictory. Thus  $\phi$  will represent a formal falsity or *falsism*, and  $\tau$  will represent a formal truth or *truism*. The rules for the conjunction of  $\phi$  and  $\tau$  with any other proposition are the following:—

*nation.* Hence the proper form for expressing the argument *Ponendo Tollens* is that given in the text.



Rule of Nonsignificance:  $a\phi = \phi$ .

For  $a\phi = aa\bar{a} = a\bar{a} = \phi$ .

Rule of Insignificance:  $a\tau = a$ .

For, in the Law of Dichotomy,  $\bar{a}\bar{c} \bar{a}\bar{c} = \bar{a}$ ,

Write  $a$  for  $c$ , thus:  $\bar{a}\bar{a} \bar{a}\bar{a} = \bar{a}$ ;

that is  $\bar{a}\tau = \bar{a}$ .

In this way we have proved our right to introduce these constants  $\phi$  and  $\tau$  into the logical calculus, by deducing their existence and modes of combining with other propositions from the fundamental laws. The rules of conjunction may be read: *The conjunction of a falsism with any proposition is a falsism: and a truism may be omitted as an insignificant determinant.* Regarding determination as analogous to addition, the Laws  $a\phi = \phi$  and  $a\tau = a$  are respectively analogous to the Arithmetical Laws  $a + \infty = \infty$  and  $a + 0 = a$ . In other words,  $\phi$  is the *infinite*, and  $\tau$  the *zero* of determinative synthesis. This observation shows the degree of arbitrariness involved in Boole's plan of representing these symbols by 0 and 1 respectively.

An obvious corollary from the Rules of Nonsignificance and Insignificance is that:—

$$\bar{a}\bar{c}\bar{c} = \tau.$$

$$\text{For } \bar{a}\bar{c}\bar{c} = \bar{a}\phi = \phi = \tau.$$

Interpreted in hypothetical form, this becomes: "If  $a$  and  $c$ , then  $c$ " is a truism. That is, the formula  $\bar{a}\bar{c}\bar{c} = \tau$  in which the rules of falsism and truism are combined may be interpreted as exhibiting the *Principle of Formal Implication*.

The use of the constants  $\tau$  and  $\phi$  requires some discussion. Boole used non-formal equations  $x = 1$  and  $x = 0$  to represent respectively " $x$  is true" and " $x$  is false". But this procedure appears to suggest an illusory distinction between the propositional symbol and the equation. For the formal logician, in admitting into his system the judgment " $x$  is true" or " $x$  is false," admits neither more nor less than the judgment  $x$  or  $\bar{x}$ . If  $x$  is a non-formal proposition, formal logic cannot guarantee its truth: it can only regard it as a *determinant* of the system of truth obtained from other than formal sources. Hence instead of using *equations* to represent non-formal judgments, I shall use separate letter-symbols  $x, \bar{x}$ . Instead of distinguishing  $x$  from  $x = 1$ , Formal Logic requires to distinguish a non-formal judgment—for which 1 *cannot* be substituted, i.e., which *cannot* be

omitted as an insignificant determinant—from a formal judgment—for which 1 *may* be substituted, *i.e.*, which *may* be omitted as an insignificant determinant. In my method, therefore, an explicit equivalence indicated by the symbol  $=$ , must always be understood as a *formal* equivalence.

§ 6. *General Formula for Expansion and Elimination.* By continued application of the Rule of Distribution, we have seen that any complex may be resolved into a conjunction of simple disjunctives. Consider then any letter  $x$ . The disjunctive  $\overline{x}x\bar{a} = \tau$  may be omitted as an insignificant determinant. Again, a disjunctive involving neither  $x$  nor  $\bar{x}$  may, by the Law of Dichotomy, be resolved into two disjunctives—one containing  $x$  and the other  $\bar{x}$ . Lastly, by the Rule of Distribution, the disjunctives containing  $x$  may be compounded into a single disjunctive containing  $x$ , and those containing  $\bar{x}$  into a single disjunctive containing  $\bar{x}$ . Thus any complex, say  $\overline{f(x)}$ , involving  $x$  may be written:—

$$\overline{f(x)} = \overline{x a} \overline{x c} = \dots \overline{a c} \text{ by Elimination,}$$

where  $a$  and  $c$  do not contain  $x$  and are, therefore, unaltered when any value is given to  $x$ . If then we give to  $x$  successively the values  $\tau$  and  $\phi$ , we have:—

$$\begin{aligned}\overline{f(\tau)} &= \overline{\tau a} \overline{\tau c} = \bar{a} \bar{\phi} = \bar{a} \tau = \bar{a}; \\ \overline{f(\phi)} &= \overline{\phi a} \overline{\phi c} = \bar{\phi} \bar{c} = \tau \bar{c} = \bar{c}.\end{aligned}$$

Hence, by Reciprocity,  $a = f(\tau)$  and  $c = f(\phi)$ .

$$\therefore \overline{f(x)} = \overline{x f(\tau)} \overline{x f(\phi)} = \dots \overline{f(\tau)} \overline{f(\phi)}.$$

This result is equivalent to Boole's formulæ of Expansion and Elimination. It also contains the rule for evaluating  $x$ , *i.e.*, for finding what consequent follows on the supposition of  $x$ , and what antecedent must be supposed from which  $x$  will follow. That is, interpreting the two determinants of  $\overline{f(x)}$  in hypothetical form, we have:—

- (1) If  $x$  then  $\overline{f(\tau)}$  = If  $f(\tau)$  then  $\bar{x}$ .
- (2) If  $\bar{x}$  then  $\overline{f(\phi)}$  = If  $f(\phi)$  then  $x$ .

It should be explained that the rules of this section are not intended to be used for working out particular problems. For this purpose much simpler methods may always be adopted. The rules give the general form that any solution of a problem will take, and are, therefore, of considerable theoretic interest. But they are even less necessary or con-

venient for the solution of particular logical problems than are the general formulæ of Algebra for the solution of algebraical equations. But they have also a definite value, in that they enable us to prove the validity of *general methods* of solution, by supplying us with a form of proposition which is at once (1) universal, and (2) simple.

§ 7. *The Formal Introduction of Alternative Synthesis.* We define  $(x \text{ or } y)$  to mean the contradictory of  $(\bar{x} \text{ and } \bar{y})$ . Hence, by the law of Reciprocity, the contradictory of  $(x \text{ or } y)$  is  $(\bar{x} \text{ and } \bar{y})$ ; and, by the same law, the contradictory of any combination is found by replacing every constituent proposition by its contradictory, and every *and* by *or*, and every *or* by *and*. Now our formulæ of equivalence involve (1) *variable* symbols, such as  $x, y$ , which, being understood as universals, may be replaced by any other variable symbols, and (2) *invariable* symbols (*viz.*, *and* and *or*,  $\phi$  and  $\tau$ ) which *cannot* be replaced by any other symbols. Given any equivalence, then, we may replace each *variable* by its contradictory, and then take the contradictory of both sides of the equivalence. The result of this double transformation is that every *and* has been replaced by *or*, every  $\phi$  by  $\tau$ , and conversely, while the *variable* symbols have remained unchanged.

Every formal equivalence has, therefore, two reciprocal forms. The several formulæ may be simply deduced from those of (1) Dichotomy, and (2) Distribution: *viz.* :—

- (1)  $x = (x \text{ and } y) \text{ or } (x \text{ and } \bar{y})$ .
- (1')  $x = (x \text{ or } y) \text{ and } (x \text{ or } \bar{y})$ .
- (2)  $x \text{ and } (y \text{ or } z) = (x \text{ and } y) \text{ or } (x \text{ and } z)$ .
- (2')  $x \text{ or } (y \text{ and } z) = (x \text{ or } y) \text{ and } (x \text{ or } z)$ .

Thus, in (2), replace  $z$  by  $\bar{y}$ , and we have from (1)

- (3)  $x \text{ and } (y \text{ or } \bar{y}) = x$ .
- (3')  $x \text{ or } (y \text{ and } \bar{y}) = x$ .

Writing  $y \text{ or } \bar{y} = \tau$ ;  $y \text{ and } \bar{y} = \phi$ , (3) gives the rule of Insignificance: *i.e.*,  $\tau$  is insignificant as a determinant, and  $\phi$  as an alternant.

Also, if we express any function of  $x$  in the form—

- (4)  $f(x) = (a \text{ and } x) \text{ or } (c \text{ and } \bar{x})$ ;
- (4')  $f(x) = (a \text{ or } \bar{x}) \text{ and } (c \text{ or } x)$ ,

we see that  $a = f(\tau)$  and  $c = f(\phi)$ .

Lastly, by the rule of distribution, " $a \text{ or } c$ " is a determi-

nant, " $a$  and  $c$ " is an alternant of the above expression. That is, the elimination of  $x$  gives these results:—

(5)  $f(x)$  contains  $f(\tau)$  or  $f(\phi)$  as determinant;

(5')  $f(x)$  contains  $f(\tau)$  and  $f(\phi)$  as alternant.

§ 8. *The Selection of Determinants or of Alternants.* It has been already pointed out that any determinant of a given synthesis is a *conclusion* that would formally follow from the supposition of the given synthesis; and that an alternant is a *premiss* from the supposition of which the given synthesis would formally follow. Thus a determinant may be called an *implication*, and an alternant may be called an *explanation*. The implication is less determinate, while the explanation is more determinate than the given complex. Thus the discovery of implications is of the general nature of Deduction, that of explanations of the general nature of Induction. The implication or explanation that is sought is in general of some assigned description. In such a case we seek the *most determinate* implication or the *most indeterminate* explanation possible under the assigned conditions of the problem. In other words, we make as small a sacrifice of precision in the case of an implication, and as small a sacrifice of caution in the case of an explanation. In particular, our ignorance as to the truth or falsity of some constituent proposition  $x$  leads to the need for an *implication* that is independent of  $x$ . And a postulate that reality is not contingent upon the truth or falsity of some constituent  $x$  leads to the presumption of an *explanation* that is independent of  $x$ . In both these cases we find a result that involves the elimination of  $x$ . The general solution of such problems is given at the end of the last section. Thus, if  $f(x)$  is any given complex involving  $x$ , the most determinate implication not involving  $x$  is  $f(\tau)$  or  $f(\phi)$ ; the most indeterminate explanation not involving  $x$  is  $f(\tau)$  and  $f(\phi)$ . These formulæ give the general results of what may be called the Deductive and Inductive syllogism. Writing  $a$  for  $f(\tau)$  and  $c$  for  $f(\phi)$ , the synthesis—

(If  $x$ , then  $a$ ) and (If not  $x$ , then  $c$ ) has for its implication " $a$  or  $c$ ," and for its explanation " $a$  and  $c$ ".

Applications of the Deductive Formula are familiar to logicians. But it may be pointed out that the Inductive Formula has some analogy to the elimination involved in the Method of Agreement. In the simplest form of this method, we have two premisses, each of which contains a compound antecedent and consequent. The conjunction of the con-

stituents of the antecedent is the condition upon which one or other of the constituents of the consequent is assumed to depend. The two cases contain common as well as contrary elements. They may, therefore, be expressed—

$$\begin{aligned} & (\text{If } a \text{ and } x, \text{ then } b \text{ or } y) \text{ and } (\text{If } a \text{ and } \bar{x}, \text{ then } \bar{b} \text{ or } \bar{y}), \\ & = (b \text{ or } y \text{ or } \bar{a} \text{ or } \bar{x}) \text{ and } (b \text{ or } \bar{y} \text{ or } \bar{a} \text{ or } x), \\ & = b \text{ or } \bar{a} \text{ or } (y \text{ and } x) \text{ or } (\bar{y} \text{ and } \bar{x}). \end{aligned}$$

Here the alternant or explanation, obtained under the postulate of independence as regards  $x$ , is " $b$  or  $\bar{a}$ , i.e., " $\text{If } a \text{ then } b$ ".

§ 9. *Reduction of Propositional Complexes to Alternant or to Determinant Form.* The two forms of the Rule of Distribution, viz.:—

$$\begin{aligned} x \text{ and } (y \text{ or } z) &= (x \text{ and } y) \text{ or } (x \text{ and } z), \\ x \text{ or } (y \text{ and } z) &= (x \text{ or } y) \text{ and } (x \text{ or } z), \end{aligned}$$

should be compared with the Algebraical rule—

$$x \times (y + z) = (x \times y) + (x \times z).$$

The application of this latter enables us to reduce any expression from factor-form to term-form by a direct process, *but not conversely*. In Logic, on the other hand, we may use precisely the same direct process to reduce any complex either (1) from determinant-form to alternant-form, or (2) from alternant-form to determinant-form. Boole's scheme—in which *and* is denoted by  $\times$ , and *or* by  $+$ —has rendered the former of these processes familiar to all symbolists. But even those symbolists who have worked out the reciprocal relation between *and* and *or*, appear to me to be rather hampered in applying this rule of Distribution by their retention of Boole's symbols.<sup>1</sup>

The data of a logical problem are usually given as a *determinative* combination of so-called premisses. This determinative combination may be transformed into an alternative combination by the process of "multiplying out". We thus obtain the series of combinations, one or other of which must hold under the given conditions. Even this problem Jevons preferred to solve by an *indirect* method. In the converse problem, an alternative combination has to be transformed into a determinative combination. This second problem

<sup>1</sup> Arithmetical symbols might be used by those unfamiliar with Logical processes in the following way: When required to reduce to alternant-form, denote *and* by  $\times$  and *or* by  $+$ ; when required to reduce to determinant-form, denote *or* by  $\times$  and *and* by  $+$ .

Jevons called the *Inverse Problem*, and he held that it could be solved only by a succession of guesses. In reality, however, it requires only the same direct process as the first: *viz.*, the process of "multiplying out". Thus let the original combination be:—

$$\begin{aligned} & (\text{If } \bar{x} \text{ then } c) \text{ and } (\text{If } x \text{ then } a), \\ & = (x \text{ or } c) \text{ and } (\bar{x} \text{ or } a). \end{aligned}$$

Putting here  $\times$  for *and*,  $+$  for *or*, and multiplying out, we obtain after simplification:—

$$(x \text{ and } a) \text{ or } (\bar{x} \text{ and } c).$$

This is the transformation from determinative to alternative form. To transform back, we put  $\times$  for *or*,  $+$  for *and*, and multiplying out, we obtain again after simplification:—

$$(x \text{ or } c) \text{ and } (\bar{x} \text{ or } a).$$

The equivalence of these two forms—which we have obtained by applying the Rules of Distribution—is of great importance. It illustrates the formula:—

$$\begin{aligned} f(x) &= \left\{ x \text{ and } f(\tau) \right\} \text{ or } \left\{ \bar{x} \text{ and } f(\phi) \right\} \\ f(x) &= \left\{ x \text{ or } f(\phi) \right\} \text{ and } \left\{ \bar{x} \text{ or } f(\tau) \right\} \end{aligned}$$

where  $f(\tau)$ ,  $f(\phi)$  have taken the place of  $a$  and  $c$  respectively. The equivalence in question will form the basis of the method of the next article.

We see now that the dual form of the Rule of Distribution enables us to pass from a determinative to an alternative combination and *conversely*, by a direct process of the nature of *multiplying out*. And thus Jevons's so-called *Inverse Problem*, however complex, may be solved by a straightforward procedure.<sup>1</sup>

§ 10. *Proposed Notation for the General Solution of Logical Problems.* The process of "multiplying out," suggested in the last section, would be long and tedious. A very simple plan of notation will enable us to solve logical problems of

<sup>1</sup> Jevons believed that this problem was the basis of Inductive procedure. But the results obtained by it are neither more *general* nor more *conjectural* than the data. In fact, the series of propositions derived are the *determinants*, *i.e.*, the deductively implied conclusions from the data. They are not alternants or hypothetically adopted explanations. The relation between the Inverse Problem and Induction appears, therefore, to break down at every point.

the kind contemplated almost at a glance. The plan I propose is the following:—

*Represent and by horizontal juxtaposition, and or by vertical juxtaposition.*

In this method a bar—drawn horizontally or vertically—will serve the purposes of a bracket where necessary. But in this case Jevons's plan of writing *large* and *small* letters for contradictories may conveniently be adopted.<sup>1</sup> The main formulæ would now appear as follows:—

$$\begin{array}{l} A \mid \begin{array}{c} B \\ b \end{array} = A \quad ; \quad \frac{A}{Bb} = A. \\ A \mid \begin{array}{c} B \\ C \end{array} = \frac{AB}{AC} \quad ; \quad \frac{A}{BC} = \frac{A}{B} \mid \frac{A}{C}. \end{array}$$

The application of this last (the Distributive) Rule gives:—

$$\frac{AB}{CD} = \frac{A}{C} \mid \frac{B}{D} \mid \frac{A}{D} \mid \frac{B}{C}.$$

Hence, in general, we should have to distinguish the two forms:—

$$\frac{AB}{CD} \text{ and } \frac{A}{C} \mid \frac{B}{D}.$$

Of these the former contains the latter as a determinant.<sup>2</sup> But, if *contradictories* are placed in a pair of diagonally opposite corners, the horizontal or vertical bar may be omitted. Thus:—

$$\begin{array}{cc} X & A \\ C & x \end{array}$$

is a combination that may be read either in alternants or in determinants. For:—

$$(X \text{ and } A) \text{ or } (C \text{ and } x) = (X \text{ or } C) \text{ and } (A \text{ or } x),$$

according to the result of the preceding section.

By adopting the plan of placing successive letter-symbols

<sup>1</sup> A more suggestive plan would be to print the letters *upright* or *horizontally*, according as they denote any proposition or its contradictory. On this plan, the contradictory of any complex would be found by the simple expedient of *turning the paper through a right-angle*, so that every *and* would become *or* and conversely, while every constituent proposition would be replaced by its contradictory.

<sup>2</sup> In words: Of two combinations involving the same modes of synthesis of the same constituents, that one is the more determinate in which the *determinative synthesis* is *internal* to the alternative. This is one of the most important generalisations of the calculus.



in opposite corners, we may solve the *Inverse Problem* with surprising ease. The method of solution closely resembles the third of those adopted by Dr. Keynes [*Formal Logic*, p. 438], and it was this that suggested mine. I will, therefore, illustrate by taking Dr. Keynes's three examples, which are the following :—

$$\text{I. } \frac{\frac{ABC}{\overline{A}bc}}{\frac{aBC}{\overline{a}bC}} = \frac{\frac{BC}{\overline{a}C}}{\frac{Abc}{\overline{A}bc}} = \frac{C}{Ab} \left| \begin{array}{c} B \\ a \\ c \end{array} \right.$$

Here the columns or determinants may be read off :—

(C or Ab) and (B or a or c) = (If c, then Ab) and (If AC, then B).

$$\text{II. } \frac{\frac{ACe}{\overline{a}BCe}}{\frac{aBcdE}{\overline{a}bcE}} = \frac{\frac{Ce}{\overline{a}bcE}}{\frac{acdE}{\overline{a}bcE}} = \frac{C}{aE} \left| \begin{array}{c} e \\ b \\ d \\ c \end{array} \right.$$

This is read : (If c, then a E) and (If BD, then C), and (If C, then e).

$$\text{III. } \frac{\frac{ABC}{\overline{B}CD}}{\frac{aBc}{\overline{B}cd}} = \frac{\frac{Bcd}{\overline{A}bD}}{\frac{abCd}{\overline{C}d}} = \frac{B}{Cd} \left| \begin{array}{cc} C & A \\ a & D \\ d & c \end{array} \right.$$

That is : (If ab, then Cd), and (If bd, then a), and (If ABD, then C), and (If BCD, then A).<sup>1</sup>

The notation thus explained enables us to solve any problems in a simple manner. The expression in its final form may be read equally well in columns or in rows, *i.e.*, as a determinative or as an alternative synthesis. Of course, a precisely similar process may be used, if we started with determinatively given or mixed data.

<sup>1</sup> In this last problem, we first place B and b opposite; then for the B alternants, we place C and c opposite, and for the b alternants A and a. To get the simplest result, we should aim at dividing the columns into as equal divisions as possible.

The notation partially answers the purpose of diagrammatic representation. It is, in fact, a sort of cross between Jevons's "Logical Alphabet" and Dr. Venn's "Departmental Diagrams". For the departments laterally adjacent to any letter represent the divisions of the corresponding class which are left standing. Hence the notation combines in one scheme an analytical and a geometrical solution of logical problems.

§ 11. *The Synthesis of Singly-quantified Propositions.* When a proposition is analysed into subject and predication, we represent the synthesis of propositions containing *any the same subject* by a corresponding synthesis of predications. The rules, therefore, for the transformation of *propositions* may be applied to transform the *predications* of any individual subject.

Adopting now the notation of my preceding article, we write  $p \cdot q$  for *p and q*;  $p \vee q$  for *p or q*. Further, we abbreviate the universal and particular quantifications (Every  $m$ ) and (Some  $m$ ) respectively by writing:—

$$m_1 \cdot m_2 \cdot m_3 \dots = \dot{m}; m_1 \cdot m_2 \cdot m_3 \dots = \dot{m}.$$

Hence, by the associative and commutative laws:—

$$(1) \dot{m}p \cdot \dot{m}q = \dot{m} (p \cdot q). \quad (2) \dot{m}p \cdot \dot{m}q = \dot{m} (p \vee q).$$

In words: (1) *Universals* may be *determinatively* compounded or resolved by determinatively compounding or resolving their predications; (2) *Particulars* may be *alternatively* compounded or resolved by alternatively compounding or resolving their predications.

Hence, by the law of dichotomy:—

$$\begin{aligned} \dot{m}p &= \dot{m} (p \cdot q) \cdot \dot{m} (p \cdot \bar{q}); \quad \dot{m}q = \dot{m} (p \cdot q) \cdot \dot{m} (\bar{p} \cdot q). \\ \dot{m}p &= \dot{m} (p \cdot q) \cdot \dot{m} (p \cdot \bar{q}); \quad \dot{m}q = \dot{m} (p \cdot q) \cdot \dot{m} (\bar{p} \cdot q). \end{aligned}$$

Observing here that the universals  $\dot{m}p$  and  $\dot{m}q$  contain the common determinant  $\dot{m} (p \cdot q)$ , and that the particulars  $\dot{m}p$  and  $\dot{m}q$  contain the common alternant  $\dot{m} (p \cdot q)$ , we have, by the rule of distribution:—

$$(3) \dot{m}p \cdot \dot{m}q = \dot{m} (p \cdot q) \cdot \{ \dot{m} (p \cdot \bar{q}) \cdot \dot{m} (\bar{p} \cdot q) \}$$

$$(4) \dot{m}p \cdot \dot{m}q = \dot{m} (p \cdot q) \cdot \{ \dot{m} (p \cdot \bar{q}) \cdot \dot{m} (\bar{p} \cdot q) \}$$

In words: (3) The alternative combination of universals is more determinate than the universal obtained by alternatively combining the predications; (4) The determinative

combination of particulars is less determinate than the particular obtained by determinatively combining the predication.<sup>1</sup>

Observing, further, that the alternant  $\dot{m} (p \cdot \bar{q})$  contained in  $\dot{m}p$  contradicts the determinant  $\dot{m} (\bar{p} \cdot q)$  contained in  $\dot{m}q$ , it follows that—

$$(5) \dot{m}p \cdot \dot{m}q = \dot{m} (p \cdot q) \cdot \dot{m}q.$$

$$(6) \dot{m}q \cdot \dot{m}p = \dot{m} (p \cdot q) \cdot \dot{m}p.$$

In words : (1) and (5) The predication of a universal may be determinatively combined with the predication of any co-determinant ; (2) and (6) The predication of a particular may be alternatively combined with the predication of any co-alternant.

§ 12. *Synthesis of Multiply-quantified Propositions.* In multiply-quantified propositions, the *external* quantification must be regarded primarily as quantified subject, and all that is *internal* to it as the predication for that subject. If this principle is clearly grasped, it will easily be seen that the rules for the synthesis of multiply-quantified propositions follow immediately from those for the synthesis of singly-quantified propositions. *E.g.* :—

$$\begin{aligned} \dot{m}\dot{n} p_{mn} \cdot \dot{m}\dot{n} q_{mn} &= \dot{m} (\dot{n}p_{mn} \cdot \dot{n}q_{mn}) \text{ by (1).} \\ &= \dot{m} \{ \dot{n} (p \cdot q)_{mn} \cdot \dot{n}q_{mn} \} \text{ by (5).} \end{aligned}$$

The only application of this principle that requires special notice is that from such equivalences as—

$$(1) \dot{m}p_m \cdot \dot{m}q_m = \dot{m} (p \cdot q)_m.$$

$$(4) \dot{m}p_m \cdot \dot{m}q_m = \dots \dot{m} (p \cdot q)_m,$$

we may deduce the rules for the *commutation of quantifications*, viz. :—

$$(A) \dot{m}\dot{n} p_{mn} = \dot{n}\dot{m} p_{mn},$$

$$(B) \dot{n}\dot{m} p_{mn} = \dots \dot{m}\dot{n} p_{mn}.$$

In words : (A) Similar quantifications may be commuted ; (B) The internal quantification has potency over the external.

Besides these rules, the following obvious, but important, observations must be added : I. A quantified symbol attached

<sup>1</sup> These rules illustrate the principle : Internal synthesis has potency over external synthesis. [See note, p. 355.]

to a molecular proposition that does not contain that symbol as suffix may be omitted; thus  $mp_n = p_n$ . Hence II. A quantified symbol may be transferred across any determinant or alternant that does not contain that symbol, *e.g.* :—

$$\dot{m}\dot{n} (b_m \cdot k_{mn}) = \dot{m} (b_m \cdot \dot{n}k_{mn}).$$

Now two subject-symbols may be called *independent* of one another if they are not connected directly or mediately in the moleculars: thus, in the synthesis  $p_{xy} \cdot q_{yz}$ ,  $x$  is directly connected with  $y$  and (through  $y$ ) it is mediately connected with  $z$ . Hence  $x$ ,  $y$ ,  $z$  are here *not* independent subject-symbols. But in the synthesis  $p_{xy} \cdot q_y \cdot r_s$ ,  $s$  is independent of  $x$ ,  $y$ ,  $z$ . This leads to a third observation, *viz.*: III. The order of externality amongst independent quantifications is indifferent. Thus :—

$$\dot{n}\dot{m} (p_m \cdot q_n) = \dot{n} (q_n \cdot \dot{m}p_m) = \dot{n}q_n \cdot \dot{m}p_m = \dot{m}\dot{n} (p_m \cdot q_n).$$

IV. Conversely, then, propositions expressed in independent subject-symbols may be at once synthesised into a single proposition. Thus :—

$$\begin{aligned} \dot{m} \dot{x} \dot{u} [p] \cdot \dot{n} \dot{v} \dot{z} [q] &= \dot{m} \dot{x} \dot{u} \dot{n} \dot{v} \dot{z} [p \cdot q] \\ &= \dot{m} \dot{n} \dot{v} \dot{z} \dot{x} \dot{u} [p \cdot q], \end{aligned}$$

where  $p$  and  $q$  are any complexes involving the subjects,  $m$ ,  $x$ ,  $u$  and  $n$ ,  $v$ ,  $z$  respectively. In such a combination, we may arrange the quantifications of one group in any order amongst those of an independent group, but we must not disarrange the quantifications of the separate propositions synthesised.

The simplest example of this procedure is in the determinative combination of a universal and particular. *E.g.*, given the synthesis  $\dot{m}p_m \cdot \dot{n}q_n = \dot{m}\dot{n} (p_m \cdot q_n)$ . If now  $m$  and  $n$ —though explicitly different symbols—really refer to the same universe, we may drop the internal and universally quantified symbol  $n$ , and replace it by  $m$ , so that we have  $\dot{m} \cdot (p \cdot q)_m$  as a determinant. This method will be required in the next section.

§ 13. *Method for Selecting Determinants or Alternants.* It has been explained that the general aim in selecting determinants or alternants is to find the most determinate determinant or the most indeterminate alternant of some assigned description. In solving such problems, the following simple rule has to be adopted: Before dropping any determinants, internalise every determinative synthesis; and

before dropping any alternants, internalise every alternative synthesis.<sup>1</sup>

The explanation of this rule in detail will require us to take up the three following problems in the order of their complexity: I. The synthesis of unanalysed propositions; II. The synthesis of singly-quantified propositions; III. The synthesis of multiply-quantified propositions.

I shall refer only to the selection of *determinants*. The principles for the selection of alternants may be derived from those for the selection of determinants by simply interchanging the terms determinative and alternative, universal and particular.

I. *The Selection of a Determinant from a Synthesis of Unanalysed Propositions.* Following the rule—"Internalise every determinative synthesis," we must begin by (1) expressing the propositional synthesis in a series of propositional alternants. Thus:—

$$\{ (p \text{ and } x) \text{ or } (q \text{ and } y) \} \text{ and } \{ (c \text{ and } \bar{x}) \text{ or } z \}$$

becomes

$$(p \text{ and } x \text{ and } z) \text{ or } (q \text{ and } y \text{ and } z) \text{ or } (q \text{ and } c \text{ and } \bar{x} \text{ and } y)$$

according to the rule of distribution. [We may here introduce any simplifications that leave the determinative synthesis internal to the alternative.] A determinant of the whole complex may now be found by (2) *taking a determinant from every alternant.*<sup>2</sup> Thus:—

$$p \text{ or } (q \text{ and } y) \text{ or } (q \text{ and } c \text{ and } y) = p \text{ or } (q \text{ and } y)$$

is the determinant from which  $x$  and  $z$  have been eliminated. The rule is a direct corollary from the Rule of Distribution (writing  $\times$  for *or*, and  $+$  for *and*). To obtain the most determinate determinant from a synthesis of unanalysed propositions, it is, therefore, only necessary to remember to express the synthesis in *alternants* before dropping the determinants not needed.

II. *The Selection of a Determinant from the Synthesis of Singly-quantified Propositions.* Here, as before, we first internalise every determinative synthesis, by expressing the propositional synthesis in a series of propositional alternants.

<sup>1</sup> In accordance with the principle that *internal synthesis has potency over external*.

<sup>2</sup> This rule is equivalent to that given by Dr. Mitchell. [*J. H. S. Studies*, p. 80.]

Now each alternant will involve determinants, which may be *universal* or *particular* propositions. Now in these alternants we have again to internalise the determinative syntheses as far as possible. That is: In each alternant, combine determinatively the predications of every *universal* determinant with those of each co-determinant (in accordance with formulæ (1) and (5) of § 11). The remaining processes are merely a repetition of the two processes of I., working with predications instead of with propositions.

For example:—

(Every  $m$  is  $p$ , or Some  $m$  is  $q$ ), and (No  $m$  is  $q$ , or Every  $m$  is  $s$ ).

This must *first* be expressed in alternants; thus:—

(Every  $m$  is  $p$ , and Every  $m$  is  $\bar{q}$ ), or (Some  $m$  is  $q$ , and Every  $m$  is  $s$ ).

*Secondly*, we must combine the predications determinatively; thus:—

(Every  $m$  is  $p$  and  $\bar{q}$ ) or { (Some  $m$  is  $q$  and  $s$ ) and Every  $m$  is  $s$  }.

*Thirdly*, supposing the letters  $p, q, s$  to stand for complex predications, we must express the predications of the above propositions in *alternants*. And—

*Fourthly*, we must select the appropriate determinants from each alternant last formed.

III. *The Selection of a Determinant from the Synthesis of Multiply-quantified Propositions.* Here, as before, the first step is to express the propositional synthesis in a series of propositional alternants. Each alternant may then be considered separately, as a determinative synthesis of variously quantified propositions. Of the various ways in which these propositions may be synthesised into a single proposition, we must choose according to the following principle: *viz.*, so that the particular quantifications are, as far as possible, external to the universal.<sup>1</sup> *E.g.*, consider the synthesis:—

$$\dot{m} \ x \ \dot{u} \ [p] \text{ and } \dot{n} \ \dot{v} \ z \ [q],$$

where  $p$  is a complex of moleculars involving  $m, x, u$ , and  $q$  a complex of moleculars involving  $n, v, z$ . In synthesising here, we must first place the particular  $\dot{m}$  externally to the universal  $\dot{n}$ . Having done so, we have the choice of placing

<sup>1</sup> According to the rule—"Internalise every determinative synthesis".

$\dot{u}$  externally to  $n$ , or of placing  $\dot{v}$  externally to  $x$ . The above synthesis gives then :—

$$\dot{m} \dot{x} \dot{u} \dot{n} \dot{v} \dot{z} [p \cdot q] = \dot{m} \dot{n} \dot{v} \dot{z} \dot{x} \dot{u} [p \cdot q].$$

These two forms are at present equivalent, because the symbols  $m$ ,  $x$ ,  $u$  are independent of  $n$ ,  $v$ ,  $z$ .

Now the chief consideration required for our present problem is that *different* subject-symbols have often to be used to refer to *the same* universe or category of subjects. Suppose, then, in the given problem  $m$  and  $z$  really refer to the same universe, although they are explicitly different symbols. In such a case a determinant may always be found by the following rule :—

Of the two equivalent subject-symbols, the *internal* one may be dropped as a quantified subject, if it is *universally quantified*, and may be replaced as a suffix by the other equivalent subject-symbol.

For a universally quantified term may be transferred *externally* until it merges with its equivalent. In the given problem, then, we may drop the quantification  $z$ , and replace the suffix  $z$  by  $m$ . We thus obtain the two determinants :—

$$\dot{m} \dot{x} \dot{u} \dot{n} \dot{v} [p \cdot q] \cdot \dot{m} \dot{n} \dot{v} \dot{x} \dot{u} [p \cdot q],$$

where  $z$  has been replaced by  $m$  in the complex  $q$ . We have now *internalised* the predications  $p$  and  $q$  as determinatively as possible. Finally, we must make our selection of determinants from the *entire synthesis* :—

$$\dot{m} \dot{x} \dot{u} [p] \cdot \dot{n} \dot{v} \dot{m} [q] \cdot \dot{m} \dot{x} \dot{u} \dot{n} \dot{v} [p \cdot q] \cdot \dot{m} \dot{n} \dot{v} \dot{x} \dot{u} [p \cdot q].$$



#### IV.—THE FIELD OF ÆSTHETICS PSYCHOLOGICALLY CONSIDERED. I.

By H. R. MARSHALL.

§ 1. Æsthetics may be looked upon as a special branch of the broader Science of Hedonics, and must be so viewed, it appears to me, if we are to make satisfactory progress in the psychological treatment of its problems.

If this be true, the Pleasure-Pain theory which I have advanced (see MIND, 56, 63, and 64) should find corroboration in the phenomena which we call Æsthetic, and the theory in its turn should aid us in grasping Æsthetic principles.

It is probable that some of my readers will be unable to accept as self-evident my position that the essential characteristic in Æsthetics is to be found in the hedonic effect produced by the work of Art,<sup>1</sup> and therefore before I can make use of the corroborative evidence or attempt to indicate the Æsthetic principles to which the theory seems to lead it is necessary to ask these readers to review the steps which lead me to take this view.

It must be stated here that I shall, in what follows, use the words Art and Æsthetics in a very wide sense.

Any device of man which serves to produce in any one an Æsthetic thrill I shall not hesitate to call a work of Art. When a man is experiencing or has experienced an Æsthetic feeling must be judged by his statement which cannot be questioned or by some less distinct expression. We must allow that that object has wrought an Æsthetic effect which has produced on general lines the same individual or racial expression that we accept as evidence of Æsthetic enjoyment in ourselves and our own friends with whom we sympathise fully. I think this wide use of terms will be justified in what follows.

Comparatively few people in our day, even among those who claim wide cultivation, realise how much of human

<sup>1</sup> This consideration of the effect upon the observer is too often obscured by failure to separate it from the problem concerning the impulse which leads to Art production, which is on its face an entirely different matter.

thought has been given in the past to the philosophic consideration of Æsthetics, although the special student of Art theory soon becomes impressed with this fact; for turn whither he will, he finds his way blocked by the ruins of systems which obstruct and obscure his path. That we have reached very little satisfactory result is indeed true, and this fact, no doubt, explains the existing inappreciation of the importance of Æsthetic Philosophy itself and accounts for the small general interest which is taken in the work of the past in this direction.

However tedious the labour be, the student of to-day who hopes to advance must necessarily endeavour to gain a comprehensive view of what has been done in the past. Our relatively modern methods of written record have given to the thought of the past few centuries a retentiveness which makes it for us a didactic entity, and the historical method therefore has in these days become of primary importance. The student of Æsthetic theory finds his work long and laborious, and after it all, must admit, I think, on the whole, that Æsthetic Psychology has gained little of fundamental importance from the discussions by philosophers in the past. This is by no means because Æsthetic problems have been left unconsidered by the best thinkers; rather because they have looked upon them for the most part as secondary issues; issues of moment, truly, but subordinate to systemisation which from other points of view had become of predominant importance.

It is because of this subordination that we find on every side presentations of eminently partial views. In some cases these are held as valid, and made the basis of unsatisfactory dogmatism. In other cases we find the discussion carried forward on lines so narrow that the student becomes doubtful how far the writer has intended to claim his principles as fundamental. Note, for instance, the Cartesian treatment of beauty which limits its range to elements of sight pleasure; and the notion of Aristotle as to the relation of Imitation to Art, to which we refer below: views of masters these are indeed; but views which we are unable to take seriously, now-a-days.

It happens thus that our study brings the masters of thought before us in most cases as "prophets," in the old Scriptural sense, rather than as scientific teachers. They furnish us with inspiration for our work and with data of value drawn from their own experience; of more value indeed, for the most part, than the theories which they propound. On the other hand, we find in many cases men of less im-

portance in the world of thought touching special problems of psychologic æsthetics in more satisfactory manner than the well-recognised master.<sup>1</sup>

It seems to me clear that Non-hedonistic Æsthetic theories have, from a psychological point of view, resulted in failure.

In the section which follows this I attempt to show the lines on which these non-hedonistic theories have developed and the directions in which they fail.

This section may be passed over without break in the argument by any reader who will allow the points contained in the paragraphs with which the third section opens.

§ 2. The earliest definite thought centres around objects which attract attention : nor is this objective reference exclusively a characteristic of crude thinking ; it is natural for any one whose point of view is cosmological rather than psychological. We should expect, therefore, to find early writers, and in later times men for whom the world of objects is specially important, examining the beautiful object itself for some quality or qualities which must be present if it is to appear beautiful ; qualities which will account for the effect produced by its contemplation.

Aristotle's Æsthetic theory had evidently a strong objective bent. Although he held that one of the ends for which the artist worked was the giving of pleasure, this pleasure was to be given by the imitation of beautiful objects, and in these he thought he had found certain distinctly objective qualities upon which beauty depended ; — such as Order, Symmetry, a certain Magnitude.

Only fragments of his Art theory, however, seem to have come down to us, and what we have is so evidently incomplete that it can only be referred to illustratively.

His principle of Imitation, for instance, casts out of the Æsthetic field most of music and practically all of architecture, and his demand for Symmetry excludes much which all the world now-a-days agrees to call æsthetic.

Tendencies to objectivism appear in the æsthetic work of many later writers of the highest authority, *e.g.*, Herbart and

<sup>1</sup> The Æsthetic hedonist does not need to look far for the psychologic explanation of this fact, for it is well recognised that the psychosis of thought is not strong in pleasure-pain elements ; men whose lives are given to thought and who write of thought must expect to lose in themselves all predominance of Pleasure and Pain in direct connexion with the subject-matter of their writing ; and if pleasure be of the essence of æsthetics it is but natural that æsthetic problems should be given a secondary place by such writers.

his followers, and in that of men of less weight from the psychologists' standpoint. Edmund Burke, who has given us a work on the Sublime which is valuable in many directions, shows this tendency. He gives us a set of objective qualities as necessary to beauty, which are manifestly inadequate to cover the ground.<sup>1</sup> The thought of Hogarth as an active art worker in a certain line is worthy of consideration as expressing a *natural*, although superficial, solution of the Æsthetic problem. His six elements of beauty,<sup>2</sup> very different from Burke's, are equally incomprehensive.

This special method of procedure has not often been seriously carried out, however, and doubtless because the difficulties which appear soon became overwhelming. The indefinite variety of those objects which are looked upon as beautiful makes hopeless the task of enumerating objective qualities which shall cover all the ground.

Plato's ideas were emphatically objective, and, notwithstanding assertions to the contrary, modern Idealism itself has never been able to shake off this objectiveness so far as æsthetics is concerned. In presenting to us Ideals, Universals, Absolutes, as fixed æsthetic standards, it has in this very fact taken an objective attitude.<sup>3</sup> The value of modern Idealism in its bearing upon philosophic questions being granted, we must admit, I think, that psychologic æsthetics gains very little from it. So far as its tenets are not covered in what we shall discuss in what follows it gives us little in this direction which is not psychologic mysticism. It has had much to say concerning æsthetics, but largely to force it into line with some preconceived metaphysical system or to make it fill some gap which otherwise would leave the thought sequence incomplete.<sup>4</sup> The relation of the Universal to the Particular; of the Idea to its objective realisation; of the Absolute to the Finite, have been made to account for æsthetic effects in many different ways, but without leaving us any help in deciding why objects are beautiful or which of divergent standards must be accepted. This last question presents the great stumbling-block to the accept-

<sup>1</sup> Smallness of size — Smoothness — Gradual variation of outline — Delicacy — Brightness — Purity and softness of colour.

<sup>2</sup> Fitness to some design — Variety — Uniformity — Regularity or Symmetry — Simplicity — Intricacy — Quantity.

<sup>3</sup> Even those who turn away from an objective search would be likely to say that the æsthetic psychosis implied an objective content, but not even here are thinkers agreed; Schleiermacher seems to hold the productive faculty alone to be essential in Æsthetics.

<sup>4</sup> Kant's treatment under Quantity, Quality, Relativity, Modality.

ance of *any* form of Universal Idealism or Absolutism, so far as Æsthetic standard is concerned; for if there be an absolute Ideal Beauty, a Universal Beauty, why should any one differ radically from me as to whether an object before us is æsthetic or not? Or again, why should my own change of mental attitude make me think that beautiful now, which some years ago I thought worthless? Perhaps my reader will say, with Lotze, that development of capacity for the apprehension of this Ideal is necessary; that if he thinks the object before us is beautiful and I do not, it shows that my capacity to grasp the Ideal is more limited than his own. But suppose before us an object which you call æsthetic, and which is not merely negatively indifferent to me, but positively ugly—disagreeable to me; although I may perhaps be able to look back to a time when it was æsthetic for me also. It is not that I find it unæsthetic, but utterly the reverse of æsthetic; that is, it is quite *opposed* to my standard, while it is in accord with yours; the standards, therefore, cannot differ by mere limitation, but are radically contradictory. Bergman<sup>1</sup> suggests the ingenious hypothesis that the difference lies in actual difference of object grasped; that you and I *think* we grasp the same thing, but really do not. That the Ideals do not differ, but that we are incorrectly comparing different Ideals. If this position be accepted, we must, so far as I can see, acknowledge all taste as equally authoritative in the positing of a standard, and this takes away the very basis of the Idealistic position here discussed. Perhaps it might be maintained that, notwithstanding this diversity of the appreciation of beauty, the criterion of Universality is valid, by claiming that that is called beautiful which we *think* of as Universal, however far that Universality may be from being a fact. Such argument, however, will not hold, for in most cases we are aware fully of the existence of diverse views as to the object which is beautiful for us, and notwithstanding this, our feeling is distinct and clear and is not in its essence changed by any consideration of the fact that others differ from us in their judgment.

Mr. Begg,<sup>2</sup> who approaches the subject from an intuitionist's standpoint, takes a distinct objective position, and acutely suggests that diversity of standard does not argue against the objectiveness of beauty but in favour of its universal distribution. Different people differ in their capacity

<sup>1</sup> Bergman, *Ueber das Schöne*, pp. 168 ff.

<sup>2</sup> W. Proudfoot Begg, *The Development of Taste and other Studies in Æsthetics*, chap. viii.

to perceive the beauty in some special object, but it is there for all that, if one single person sees it. He who considers the object ugly is so constituted that he is affected by other qualities in the object than its beauty, and these latter draw his thought away to special ugliness.

Such a position, however, if I understand it, can be maintained only by one who has not yet seen the force of the modern criticism of "faculty psychology". The argument in favour of beauty as a manifestation of an objective universality is weakened by the lack of any clear separation of the character of universality from the non-æsthetic. I, for my part, cannot agree that the merely agreeable is not often recognised as non-individual. What others call pleasure, people as a rule are very ready to class as agreeable, while they are not at all ready to allow an objective impression to be beautiful unless they delight in it themselves. On the other hand, I cannot feel that the æsthetic thrill is any less egoistic than the most purely individual sense gratification. Truly the work of art is realised as giving pleasure to others as well as ourselves, and this knowledge of sympathy adds keenly to our enjoyment, but mere universality does not raise a pleasure into the æsthetic field, for were this so, many of those pleasures which we call the very lowest would be of the very highest æsthetic value, and much that we hold to be best would be cut out of the field by the smallness of the number who rejoice with us. It is patent to all that the world of the artist who is in advance is small, and yet we cannot on any acceptance of terms say that his work is on that account un-æsthetic. If we gain little else from the study of these systems, one fact is brought to our notice which is of considerable psychologic importance, and to which we shall return, namely, that these thinkers find their æsthetic field not only wide but relatively permanent; were it not so, introspection would so clearly deny the conceptions of Universality and Absolutism that they could not be defended.

Let us now turn to the subjective view of the Æsthetic Field.

Could we go back to the days of the "Faculty Psychologists" our task were simple, for then we, with Shaftesbury and Hutcheson, might satisfy ourselves by the assumption of a special internal sense for the perception of beauty; modern psychology, however, compels us to discard this and all kindred views.

Earlier thought of an introspective character, whatever be its direction, tends to lay especial stress upon (a) Sen-

sualism. We see this to-day in the careful work of our painstaking psycho-physicists and in the thought of those whom they influence : in fact, we all find it difficult to avoid over-emphasis of the importance of sense-organ products. The study of the beautiful from its introspective side has not infrequently shown this same over-emphasis.<sup>1</sup> The very term *Æsthetics* in its derivation has a *sense* connotation : Baumgarten first used it because he looked upon the beautiful as the perfection of Sensuous knowledge, and Kant's "*Transcendental Æsthetic*" treats of the *a priori* principles of *Sense*. Perhaps the most thorough-going statement of the Sensualistic position is given in our own time by Mr. Grant Allen in his *Physiological Æsthetics*, but he himself has apparently lost faith in his own work<sup>2</sup> in this special direction, and it need not therefore be considered at length. Although the sense-impressions give the normal initiative in a vast majority of our æsthetic psychoses, it is impossible in the field of sense to obtain any satisfactory solution of æsthetic problems : and men will not accept a view so narrow ; they recognise at once that the effect produced upon them by a beautiful object is wider and fuller than sense-impression.

(b) If the use of terms forms a basis for classification, a good deal of the theory of the past may be classed as *Emotional*, and this is true, especially among English thinkers, of whom we may mention Alison and Jas. Mill. But "*Emotion*" is a word of very indefinite meaning when it is made to describe the æsthetic field. It is either employed with little departure from the usage of the question-waiving "*faculty psychologists*," or else it represents little more than complexity of Pleasure or Pain. Emotionalism under the first signification merely restates the questions of *Æsthetics*, and under the second throws us back upon hedonism, which we shall presently consider.

(c) The most emphatic drift of thought in the direction of the Content is, and has been, towards *Intellectualism*, and naturally so. When critical examination fails to show any special intellectual product which, in width and in nature, corresponds with *Æsthetic* effect, there is a natural diversion of attention to the examination of the Intellectual processes

<sup>1</sup> Burke is quoted by Von Hartmann as a representative sensualist, but I think it more proper to class him as an Emotionalist. He defines Beauty as a "quality by which an object causes love or some passion similar to it".

<sup>2</sup> See *MIND*, No. 45.



themselves, which leads in its extreme development to (d) bald Rationalism.

"Harmony" of mental action (and cruder notions as to objective harmony are seldom altogether eliminated) and the process of "Unification of the Manifold" are now and again brought forward as all sufficient to account for Æsthetic result: but it is easy to show that we live in an atmosphere of harmonies and are constantly dealing with unities in manifoldness which not only have no marked æsthetic character, but ordinarily are devoid of all æsthetic character whatever, and the same argument holds against other similar principles.

Rationalism even in its crudest form takes a strong hold upon men's minds, and maintains its ground, especially among German thinkers, although often too covertly held and vaguely stated. It is easy to see, however, that no amount of argument, however conclusive its form may be, can change our notion of what is, or what is not, beautiful unless it induce an actual change in the matter which is presented to thought. No better position is gained by referring the process to sub-consciousness;—by arguing that the effect is due to recognition of relations too delicate to rise above the "threshold," but grasped, for all that, in the Æsthetic state of mind.

This is a cowardly means of covering defeat which one with no little surprise finds willingly accepted by thinkers of the highest rank to this day (*e.g.*, Helmholtz and his school), and with the best of authorities in the past to give weight to such method: for it must be remembered that Kant was only willing to give Music a position among the Arts of Beauty because of the fine mathematical relation between harmonious tones which from other investigations have been found to exist, and which he supposed to be sub-consciously grasped in the Æsthetic effects of Music.

The vaguer statements of simpler Intellectualism, which one finds so frequently, merely go to emphasise the fact that reflective thought is of the greatest importance in the Æsthetic psychosis. The best work of later writers, as we shall see in what follows, tends to give value not only to the Sensual, and the Emotional, but also to the Intellectual, as all involved in the æsthetic state, as we know it, and this is the position to which we would be led by our synthetic line of thought, if no other evidence appeared.

I do not find that the contentions of the Formalist, except so far as they are hedonistic, go far to help us psychologically. Concrete formalism fails to give us any unassail-

able criterion of the æsthetic, and abstract formalism gives us nothing more valuable, from our point of view, than a mere restatement of the fact that we must look elsewhere than to sensualism, or to the matter of the content, for the essence of the æsthetic. But so far as Formalism is hedonistic, it points, it seems to me, in the right direction. This hedonistic view will receive full discussion in what follows.

§ 3. Although the discussions which have been above reviewed are very unsatisfying, they serve to give emphasis to the fact that the field of Æsthetics is always hedonic; and this is a fact of great psychological importance. Whatever else may be said of the æsthetic mental state, its pleasurable-ness cannot be questioned. It is not necessary therefore to prove the hedonic connexion, and, on the other hand, I do not see how it is possible for any one to pass it over lightly. Thinkers of all grades and of all schools, from Aristotle downwards, acknowledge the necessary connexion with pleasure whatever position they take as to the value or importance of this fact.

It is not difficult indeed to find authorities, from Epicurus down, whose statements may be interpreted as decisive expressions of the view for which I argue: and some few, Fechner, for example, who distinctly base Æsthetics upon Hedonics. The average man, however, does not think of pleasurable-ness as a *characteristic* feature of the æsthetic unless his attention is called to it, and there is a good deal of popular disinclination to the treatment of pleasure as an element of any special importance in the æsthetic psychosis. Certain men of penetration also raise the most violent opposition to any such treatment.

The popular opposition is not difficult to understand, for the ordinary man does not learn of himself to catch the close relation between a thoughtful phase of psychic life (which in fact is seldom pleasurable to him) and the pleasure quality which may go with it; he habitually thinks of the two not only as separate but as in opposition, and when led to consider anything so complex as the identification of hedonic phase and æsthetic phenomena, he is unable to catch any relation between the laborious thought involved in the consideration, and the revivals which come to him in connexion with the word "pleasure". He is led astray, however, principally by his inability to think clearly. When he thinks of æsthetics he always busies himself with some content of art, and thus it not infrequently happens that it is difficult even to persuade him that pleasure is an ever-present result obtained from the consideration of art forms.

With the theoretic opposition it is not so easy to have patience. Von Hartmann<sup>1</sup> goes so far as to deny us the right to consider the hedonic quality in æsthetics as more than an accident unrelated to the essence of the Beautiful. The psychologist, however, cannot allow himself to be deterred from research in this direction by any objections determined by theoretical preconceptions, although the strong opposition deserves consideration and explanation. Hedonic the æsthetic psychosis certainly is. Whether this hedonic quality is of great moment is a question to be determined.

The Associationists in Psychology have seemed in a way to identify beauty with pleasurable by claiming it to be the result of the association with objects of agreeable and interesting ideas. Their doctrine in this regard is difficult to treat specifically because of their failure to differentiate Pleasure from the Emotions and because of their treatment of Pleasure as though it were re-presentable, in the same sense that a Content is, rather than being a quality which may attach to a presented Content without belonging to its revival at all.

That associations which are pleasurable are important elements in an æsthetic effect I agree, as will appear later. If the doctrine be held to mean, however, that æsthetic effect is determined altogether by pleasure revivals I cannot follow, for we shall presently see how much presentative pleasures have to do with the effects of beauty.

If, on the other hand, the doctrine be meant to signify an

<sup>1</sup> Confer. *Æs. seit Kant*, p. 354. Von Hartmann grounds his position upon the unimportance of the objective real thing; if this be unimportant, then so also is the hedonic aspect, for, says he, we have as little right to look for the essence of the æsthetic in the effect (*Gefühle*) as in the cause (the object). (*Æsthetik*, p. 40.) In passing one may note that there seems here to be a hidden shifting of ground. The "cause" of which he speaks is an objective thing, that which he calls "effect" is something which psychologically has no objective significance, and which hence is not an "effect" in the same sense in which the object is the "cause": the objective universality of æsthetic pleasure, which Kant upheld, not concerning us in an analysis of the psychologic state under discussion. But apart from this point, I for one cannot with Von Hartmann see any theoretical objection to looking to the *object* for our criterion, a procedure which he considers altogether reprehensible; to the object in fact we have been looking in the past, and the trouble is not that the search in this direction is illegitimate, but that all our looking has brought no result. We find nothing in the object which is always there if the æsthetic quality is to present itself to the observer. We therefore turn our attention away from this object to that much of the subjective state which is not part of this object and there we do find something which is always present where æsthetic effect is produced, *viz.*, pleasure.

identity between hedonic phenomena and æsthetic phenomena we are at once met by the objection that while all Æsthetic states of mind appear to be pleasurable not all pleasurable states are allowed to pass as æsthetic. The problem which is thus brought forward is an important one which we must consider somewhat at length. It may be stated in the form of the question : What are the bounds of the æsthetic within the hedonic field ?

No skill in introspective analysis is required to grasp the fact that there is a *separation* between hedonic and æsthetic : the careless thinker is the one most ready to take it for granted, and high authorities also make much of it. Sully, for instance, thinks Kant's elucidation of the separation of the Beautiful from the Good and the Agreeable one of his important achievements for Æsthetics.<sup>1</sup> But it appears to me that altogether too much is made of this separation. Thinkers who are our teachers have over-emphasised the separateness by drawing attention away from the *connexion* between the two fields, and it is important, I think, to take a position opposed to the usual one ; to emphasise the *lack* of separateness between Hedonics and Æsthetics.

If one examine the work of art critics and the more or less philosophic and scientific writings which deal with the *facts* of Æsthetics rather than its theory, one will find little more than descriptions of pleasure-getting coupled with more or less thorough attempts to arrange this pleasure-getting in a logical way. If, on the other hand, one examine the writings of those who have expressly studied the psychology of pleasure, one finds æsthetic phenomena treated altogether as the best-recognised data of Hedonics ; used to corroborate theory and to justify classification, exactly as the simplest sense-pleasures are used. Let us look at this from another point of view. Take into consideration any average complex æsthetic object ; we find it a very wide one with certain elements which are emphatically pleasurable. Eliminate in thought the pleasurable elements one by one, and we find that while in the main the object does not change the mass of its Content, its æsthetic quality gradually disappears. We may acknowledge still that it has a right to be named æsthetic because of the opinions of others and because of our own judgments in the past, but for ourselves at the time it has lost all that makes it worthy of being called by so honourable a name. We are all familiar with the fact that

<sup>1</sup> Article "Æsthetics," *Enc. Britannica*. Cf. also Blencke, *Die Trennung d. Schönen v. Angenehm*, p. 3.

an object which but a moment ago was æsthetic for us may become unæsthetic by a degradation to "indifference" or painfulness of the special content which was giving us pleasure. The suggestion of a ridiculous or painful association, with some essential element in an art-complex, will for all time reduce for us the æsthetic value of the whole work. The average art critic indeed very often makes and unmakes æsthetic objects for the masses in this way.

Certainly these facts indicate a very close connexion between the Hedonic and Æsthetic fields, and one which psychologically would seem to be essential. Of course the separation so commonly made must also be acknowledged, and it is worth our while, I think, to consider the main results which have been reached by those who have attempted to mark the lines of separation with distinctness.

This review, if tedious, may be passed over, and, as before, I place it in a special section for the reader's convenience.

§ 4. If the field of æsthetics be a portion of the hedonic field, it certainly ought not to be a difficult task, one would say, in some rough way to mark off that part of the hedonic field which is æsthetic from that which is not: to differentiate the one from the other by a process of limitation of the pleasure field. This, however, does not appear at all an easy matter when one comes to attempt it. The average intelligent observer who has not given the matter especial study will be likely to say, off-hand, that the sense-pleasures at all events are excluded when we refer to the æsthetic. In the exposition of theories from a non-hedonistic point of view this position has been often taken either explicitly or less directly by the limitation of the field to non-sensorial states. Kant's separation of the Agreeable from the Beautiful indeed turns largely upon his notion that the sense-pleasures, which are essential to the former, are wanting in the latter. That æsthetic pleasure is wider than sense is not open to question, but it must be granted that we obtain well-marked æsthetic results which cannot be separated from sensation, such as we find, *e.g.*, in the impression produced by a rich colouring, and in the fulness of simple tones. We find indeed when we go to the root of the matter that it is only the so-called "lower sense" pleasures which it is desired to exclude. The inclusion of sense effects through eye and ear does not create opposition. But it seems to me that if it be admitted that one set of senses can produce æsthetic effect the whole contention fails; and a close examination shows clearly, I think, that the rest of the senses may act in the same manner in the make-up of æsthetic complexes. This

a large majority of the more capable thinkers find it necessary to acknowledge, for they do not hesitate to take the pleasures of the sense-impression into account. Nobody can complain that Lotze had leanings towards sensualism. But he says clearly in this connexion<sup>1</sup> that the first condition of a work of art is its power to please the senses.<sup>2</sup> "If we step into the shadow of the wood at height of noon," says Bergman, "the agreeable refreshment is bound up with the idea of the grandeur of the forest; the refreshing coolness belongs to that which we feel to be the beauty of the wood;" and this comes from one who lays the basis of æsthetics in contemplative thought. For my own part, I feel that the pleasurable impression of any sense may become a rich component part of an æsthetic delight.

If one follow Alison or James Mill and his school,<sup>3</sup> he will refer all æsthetic enjoyment to emotional association. So far as this theory is separable from pure hedonism it is doubtless based upon introspective examination, which for certain people (and to this class I belong) shows powerful elements of Emotion in many æsthetic complexes. For me, Love, Fear, Sorrow, Joy, &c., appear to be part and parcel of many an æsthetic effect. I think it clear therefore that pleasures of the typical emotions are of great moment in æsthetics, but at the same time it is equally true that they do not stand alone as the basis of æsthetic effect. "Association" by itself can of course give no account of distinctively æsthetic effect. It is a principle of important consideration in æsthetics as in all phases of mental life. It shows us the movement by which we reach the beautiful but certainly not the exclusive qualities which produce the distinctive effect.

The historically related opponents of Mill, *viz.*, Reid, Hamilton, and Stewart, all upheld a view which asserts the non-importance of Emotion in claiming overmuch for Intellect; they, however, show more or less willingness to

<sup>1</sup> *Outlines of Æsthetics*, § 23.

<sup>2</sup> The objection of the German Idealists to the consideration of sense-pleasures as of æsthetic worth is based upon theory, but it cannot be supposed that they would uphold views which contradict their experience, and we must seek later to account for so strong an opposition. There is serious objection to the limitation of the use of the word æsthetic to exclude all but the "Scheingefühle" as Von Hartmann does, in the fact that the word now covers very generally the whole ground of the Beautiful, and objective evidence shows that people generally do not accept such a limitation.

<sup>3</sup> J. S. Mill thought that his father had an unconscious follower in John Ruskin. (See his edition of J. Mill's *Analysis*, vol. ii. 253.)

admit the worth of other factors. Other writers go much farther (*e.g.*, Hemsterhuis, Diderot) in their restriction of the æsthetic to the intellectual activities. Kant excludes sense and depends upon reflexion. Both Emotional and Intellectual theories are weakened by failure to accept the sense-element as valuable, but apart from this, such opposed theories, although upheld by thinkers of power, are mutually destructive as arguments looking to the fixing of æsthetic differentia, on account of this very opposition. It is incredible that emotional association can be all of æsthetic enjoyment, when the experience of such men as Reid and Hamilton and Stewart could lead them to hold it unimportant; or that Intellectual activity can be all-important, when the Associationists were able practically to ignore it.

It may be well perhaps to note some late examples of the Intellectual Emphasis. Prof. G. T. Ladd, who does not by any means ignore the sensuous basis, holds (*Elements of Physiological Psychology*, p. 521) that "even most elementary æsthetic feelings cannot be considered as on a par with the sensuous feelings or as mere aggregates of such feelings. The tone of feeling which characterises the sensations furnishes a material for genuinely æsthetic feeling, but the latter always implies also the working of certain intellectual laws and a union of simple feelings of sensation under time-form and space-form." But where shall we find the space-form or time-form in the æsthetic effect produced by mere rich colouring or by the luscious tones of the human voice apart~~ment~~ from any movement? If we follow Prof. Ladd we are compelled to deny the æsthetic quality in such cases altogether. We refer to this theory again below. Bergman's view as to contemplation has been noted. He attempts to cover the ground of Sense and Emotion by bringing them into Intellectual categories. Sense-Beauty, Form-Beauty, "Stimmung"-Beauty; but contemplation is the basis. But, on the other hand, we have no less pretentious a thinker than Von Hartmann<sup>1</sup> denying that distinctly intellectual operations are even pleasurable, and stating that for himself relations of two ideas seem absolutely indifferent up to the line where the intensity of the *Vorstellungen* becomes so strong that pain ensues. It is interesting to note that this contention is not merely modern. It goes back to Greek speculation; Chrysippus, it will be remembered, holds as an argument against Aristotle that pure speculation is a kind of amusement.

<sup>1</sup> *Es. s. Kant*, p. 289.



Many other theories have been brought forward which involve limitations, for the most part, far less narrow than in those cases which have just been considered and more often implied by over-emphasis in some special direction than upheld by specific claims : some of these deserve examination.

Reid himself finds that action of Intellect is not alone in giving æsthetic quality, but is bound up with the functioning of our moral faculty in producing the effect reached : while Hamilton, on the other hand, lays stress upon the occupation of the Imagination and Understanding in a full, free, and consequently agreeable activity. Reid shows the step (logical rather than historical) to the emphasis of the play of "Spiritual" feeling which we find in Cousin and Lévêque, in Shaftesbury and in John Ruskin, although Ruskin's æsthetic field may, perhaps, be better described as that of religious ecstasy. Hamilton, on the other hand, shows the step to the extreme emphasis of Imagination which we find in Addison. We may note also in this connexion the trend of thought of which Bergman's position already referred to is an emphatic instance, *viz.*, that the æsthetic basis is to be found in the pleasures of contemplation. But no one who takes a wider view than that of personal introspection can limit the field of æsthetics to moral or to imaginative effects, and I doubt whether any one can thus narrow his own field. He must see æsthetic effects which are non-moral, he must see others which seem to be entirely separable from the imagination ; the latter view overlooks the importance of Sense and Emotional elements, which are acknowledged now-a-days to be of great moment.<sup>1</sup>

We cannot go farther in this examination of the effort to separate the Agreeable from the Beautiful without considering Kant's notable contention in this regard. We must not overlook, at the start, the fact that the matter of Kant's consideration was by no means identical with that before us at this moment. We inquire whether in the field of Æsthetic Impression any special Hedonic Element must be cast out. Kant was concerned with the *a priori* character of his theoretical pure judgment ; and, strictly speaking, therefore, did not deal with our problem. We may, however, with profit examine his argument to see whether the

<sup>1</sup> The attempt to separate *Scheingeühle* from *reale Gefühle* (Von Hartmann's *Es.*, pp. 46 ff.), although arising from metaphysical theory, probably is psychologically based upon the same personal bias which led to Addison's extreme view, and which produces the reference to contemplation.

psychological positions involved throw any light upon our closely allied inquiry. Kant's main contention was that the judgment as to Beauty had universal validity, while that concerning the Agreeable was Individualistic,<sup>1</sup> and this was a contention into which he was led upon theoretical rather than empirical grounds. It involved for him, in the first place, the position that sense-pleasures must be excluded from the Æsthetic. For pleasure and pain spring from (1) sense-impression, or (2) from the processes involved in the binding together of ideas: only the latter of which can be general: therefore the field of sense-impression must be individual. We, dealing with the region of Æsthetic Impression, have, I think, already seen convincing evidence that sense-pleasures cannot rightly be excluded; and it seems to me that even if it were conclusively shown that they were strictly individual, *i.e.*, incommunicable, this fact would not prove them to be valueless as elements of æsthetic impression. But to return to Kant's argument, his theory in this regard led him further to hold that all Interest must be lacking in the Beautiful. The Sublime he allowed to have a moral interest—for moral interests are the *only* ones which are Universal—but *Beauty* in his view has no direct relation to morality, and, as all other than moral interests are individual, Beauty to remain Universal must exclude interest. This is evidently a position reached from a purely theoretical basis, but apparently it must have had its corroboration in his own psychologic experience. Sympathetic pleasures play an important part in all art work of higher

<sup>1</sup> Blencke (*Trennung d. Schönen v. Angenehm*, p. 39) remarks that the evidence of the psychologic soundness of Kant's position is seen in the fact that we are content to be *pleased* ourselves, while, on the other hand, we try to communicate our judgment as to beauty to others, and such a result Kant's principles would require. But it seems to me that Blencke here goes too far. In the case of pleasures involved in the action of our own peculiar organs, we recognise the pleasures as our own to be sure, but are very ready to endeavour to bring about the same experience in our companions, by urging them to taste or touch, or listen or act as we are doing; and we only feel content that they cannot experience them when we know that they have made the trial. It is merely an extension of this sympathetic altruism which leads us to endeavour to bring out for others by explanation or description the elements of a work of art which give us full pleasure; elements which are not apparent always upon the surface, and, perhaps, dependent upon the sounding of some chord which may be struck directly or associatively by discussion and description. Here, too, when we find discussion and description failing to make the object beautiful for a companion, we come to see that we experience something which he cannot grasp. There seems to be no separation between the course of thought in the two cases.

grade. Moreover, there is probably little doubt that for Kant and a large number of men of his general mental type the most valued pleasures were and are obtained in fields of disinterested effort; that for them purely egoistic pleasure-getting always carries with it an ethical reproof which leans towards the side of pain, and that for such men disinterestedness must therefore be an essential characteristic of the subjective æsthetic field. But it seems to me quite clear that this is a matter of individual mental bias. The ordinary man who is not naturally disinterested in his action does not, I am convinced, find the presence of self-interested elements a bar to æsthetic enjoyment. The pleasurable pride of ownership surely forms an element in the æsthetic delight of many an Art collector. Personal interest enters for all of us into our judgment concerning the beauty of those whom we love, and ownership has the same effect upon the judgment of many men concerning the beauty of their possessions. To return again to Kant's position. The recognition of usefulness implies self-interestedness, directly or indirectly, and Kant therefore found it necessary to hold that the taste judgment was based upon an unpurposive purpose, an *aimless* usefulness<sup>1</sup> (*Zweckmässigkeit ohne Zweck*), that is, a usefulness of such nature that it is unrecognised as useful, and hence not followed because of the interest involved. As an element in the æsthetic impression, however, I do not think that even *recognisable* usefulness can be overlooked. It is commonly supposed to be an essential to architectural beauty, at all events, and the relation to other branches of the æsthetic is also commonly supposed to be intimate. Kant stands opposed to so great a thinker as Aristotle in this respect, and later observers, such as Adam Smith, Dugald Stewart, Kames and Hogarth, and notably Fechner, make usefulness of great importance æsthetically. Usefulness *per se* in my opinion is not of so high importance as is the absence of non-usefulness, as is indeed all avoidance of shocks, but it seems to me evident that it is an æsthetic *element* for most of us, and when we find it considered of moment by such an acute observer as Fechner we are compelled to regard its exclusion as impossible. Ruskin never preached a more fallacious or mischievous doctrine than when he emphasised the thought (*Lamp of Sacrifice*) that the useless things in structure make Architecture out of Building.

<sup>1</sup> Von Hartmann, *Æs. seit Kant*, p. 23, says even this comes down to objective fitness.

Schiller restates the Kantian notion by his emphasis of the "Play Impulse" in reference to Æsthetics; the modern evolutionary school as represented by Mr. Spencer takes the same position, Prof. Bain following closely. This leads Mr. Spencer to the exclusion of "life-saving functions" from the æsthetic; but what becomes of Mr. Spencer's system if *any* functions (especially pleasurable ones) are thought of as non-life-serving, directly or indirectly, I do not clearly see. Even if some functions of the so-called "higher" kind are classified as non-life-serving, to exclude all which do so serve would surely cut off a large part of our æsthetic field.

As modern psychology draws a clear distinction between receptive and motor nerve, not unnaturally do we find a corresponding psychical distinction looked for in all directions, and Grant Allen in his *Physiological Æsthetics* has attempted to identify the æsthetic with the passive, receptive pleasures. Some such view is also found implied in the theories of not a few metaphysicians, and Fechner<sup>1</sup> takes a strong position in this direction; Mr. Allen may therefore claim the best of company. On the other hand, however, others, Schleiermacher for example, take quite an opposite position in claiming all for the productive side of mentality. Guyau's clear criticism<sup>2</sup> has given the theory of Passivity so powerful a blow that no more than reference seems needful. It is well enough to emphasise the general passive nature of the pleasure involved in æsthetic appreciation as opposed to the active pleasures obtained in the creation of an art work, but this gives us no reason for the exclusion of all pleasures of action from æsthetic compounds. Our psychic life is so bound up with the active<sup>3</sup> side that it is impossible to cut off the active element in any psychosis. Our emotions, our desires, all relate to action, and beyond that what is added to the pleasures of an æsthetic psychosis by the elements of sympathetic activity is far from small.

It is not uninteresting to note here a very late Idealistic view which apparently makes activity all-important. Prof. Ladd in his *Introduction to Philosophy* (p. 343) marks the differentia of æsthetics thus: "Nothing that is apprehended as incapable of change of motion in time or space, and so of the successive realisation of different movements of physical

<sup>1</sup> *Vors. d. Æsthetik*, vol. i. 54.

<sup>2</sup> *Problèmes de l'esthétique contemporaine*.

<sup>3</sup> Horwicz holds that the æsthetic effect produced by the representation of power is due to an aroused idea (Vorstellung) of agreeable muscular action. (*Psychologische Analysen*, Th. ii. Heft 2, p. 166.)

or psychical being, appears beautiful to the human mind. But not all movement of physical or psychical being is beautiful: the movement which is beautiful must have two characteristics. It must have spontaneity, or a certain semblance of freedom; and it must use this spontaneity, as it were, in self-limitation of an idea." It is evident from the very definition that spontaneity, pure and simple, does not approve itself to Prof. Ladd as fundamental; nor can it be held, I think, that we find the phenomena of beauty in all cases where we have "spontaneous movement which uses its spontaneity in self-limitation of an idea".

The distinction between higher and lower grades of pleasure, which is so commonly met with, is by some writers, and by many talkers, made determinant of the difference between the æsthetic and the non-æsthetic. (In Kames we find a good example of this doctrine.) There is something illusory, however, about the very notion of such a distinction, for no criterion for the valuation of pleasure *quâ* pleasure appears beyond its mere intensity.<sup>1</sup> Our gratifications are normally taken in the lines of our natural development; in higher mental regions as we rise, or sad to say, in lower regions if we fall. The direction of growth or of deterioration determines the field of pleasure-getting, and while there is the strongest ground for belief in a constant increase in pleasure-getting capacity, *pari passu* with our mental growth, still it cannot be shown that the delights reached by the man of high moral culture bring a better *quality* of pleasure to him than the gratifications of the barbarian bring to the savage mind; nor can it be shown that the pleasure which we get when we reach a higher moral position is any better *per se* than that which we experienced before we reached it. The fact is that when we speak of the "higher pleasures" we are merely restating our problem in new terms. Those pleasures which are æsthetic are the ones we call "higher," but until we can give some definite meaning to the word "higher" in this connexion we gain nothing. In most cases those who discuss the matter from this standpoint are really dealing with ethical data. It is the man who has grown to be capable of appreciating newer ethical standards, and who has lost his pleasure in the old, who makes a dis-

<sup>1</sup> As Bentham tells us: "Quantity of pleasure being equal, push-pin is as good as poetry". Confer also Dr. James Ward in *Enc. Brit.*, ix. ed., Art. "Psychology," for a careful statement of the facts. Compare Fechner (*Vor. d. Äs.*, vol. i. 26), who explains what is called "higher" pleasure as characterised merely by being itself the source of new delights.

inction between pleasures of higher and lower grade. What he has cast off as unworthy no longer gives him pleasure in contemplation and is no longer felt as æsthetic. This is not, however, because the Æsthetic has an essential ethical dependence, but because Æsthetics is founded upon Hedonics. The man has gained new fields of pleasure-getting as his character has developed: what he casts out as non-æsthetic because it is a "lower pleasure" is a pleasure merely in name, is in reality so bound up with painfulness as to be necessarily unæsthetic. This by no means shows that what was pleasurable in his undeveloped or uncultivated state was not æsthetic for him at that time, or that the pleasures of the savage are not æsthetic for him.

Not that ethical standards are unimportant in Æsthetics. Apart from the æsthetic delight, which we gain from what Aristotle calls Moral Beauty, *i.e.*, from the recognition of nobility of aim and strength of purpose, the appreciation of "æsthetic aspects of character," of "the beauty of holiness," the influence of our ethical standard upon our æsthetic field is most important; for, in the end, most thoughtful people will make their final judgments turn upon them negatively, because what is for them immoral, is painful and non-æsthetic. As we have noted above, however, the majority of our pleasures have no ethical bearings; the mass of æsthetic effects are made up of elements entirely unmoral.

The attempts to determine the bounds of the æsthetic field by a process of limitation of the hedonic appear to me to bring no satisfactory result; nor does it appear that it can be determined by the characteristic manner of presentation of the pleasures which make up the total effect. Fechner<sup>1</sup> suggested a criterion in the Immediacy of the pleasure-getting. Von Hartmann on the other hand thinks Fechner's position is altogether without foundation; holding that however immediate the pleasure connected with an object may be, it does not thus become æsthetic.<sup>2</sup> Such conflict of opinion makes this criterion unsatisfactory.

Horwicz<sup>3</sup> seems to hold that sensational pleasure and æsthetic pleasure differ not in substance but in that the æsthetic shows a broadening of the field. Guyau<sup>4</sup> follows in the same line, suggesting that the broadening of the agreeable horizon, the growth in extension of the pleasure field, is what we experience when an object appears to us to be æsthetic. This implies, as he distinctly states, that intense

<sup>1</sup> *Vorschule d. Æs.*, vol. i. 15.

<sup>2</sup> *Psy. Analysen*, vol. ii. 168.

<sup>3</sup> *Æs. seit Kant*, p. 354.

<sup>4</sup> *Problems*, pp. 75 ff.

and unextended pleasures in their very nature are unæsthetic. This does not accord with my own experience, still I shall not deny that for him a widespread thrill alone produced what he called æsthetic feeling, as may well have been the case with a man to whom sympathy was so important an element of life as it was with the writer of *L'art au point de vue sociologique*. In truth all of our notable æsthetic psychoses are summational hedonic complexes, but this fact does not show, as it is made to argue implicitly, that the pleasurable elements which make up the same are not in themselves æsthetic. I do not wish to understate the value of this width of effect in æsthetics, for I think it of very great importance.

The prominent place which Fechner gives to the Associational principle shows the importance in which he held it. All notable works of Art show it, and all persistent types of Art subject. But, on the other hand, it cannot be held that this summation *per se*, this width of field, this extensiveness, in itself is the all in all in æsthetics. To make it so forces upon us the impossible task of deciding where extension begins; compels us to look for some degree of extension on one side of which all is unæsthetic, while on the other all is æsthetic. Such a line of division, however, cannot be drawn.

(To be continued.)



## V.—DISCUSSIONS.

### THE INFLUENCE OF MUSCULAR STATES ON CONSCIOUSNESS.

By EDMUND B. DELABARRE.

In a recent dissertation<sup>1</sup> I had occasion to discuss the evidence against and in favour of the existence of sensory nerves connected with the muscles, whose function it is to indicate the different degrees of tension and contraction of these organs. The importance of this question to psychology seems to warrant the repetition in these pages, with some slight modifications and additions, of the arguments there presented. Histological investigation has as yet advanced but little toward the final solution of this problem. Physiological research is but just beginning to bring in positive results. Psychologically the strength of argument has thus far seemed to lie on the side of those who deny the existence of true muscular elements in our consciousness, for the believers in sensory elements of this kind have contented themselves more with taking them for granted than with bringing forward convincing reasons for assuming them. Such evidence in their support as can be given here will still be regarded by many as inconclusive; but it seems to me possible at least to show that the arguments against their existence are invalid, and that it is highly probable that they form a most important factor in our mental life. The latest important defence of them was that given by Bastian in the discussion in *Brain* (vol. x., 1887). Since then many plausible arguments against them have been devised. We will examine these latter first, and then see what positive evidence can be collected in favour of their existence.

1. The most natural argument, and doubtless the one which is of greatest final weight with the opposers of "muscular sensations," is that, since we have no introspective evidence of their existence, there is no reason why we should accept them. But the question of the existence of "muscular sensations" is one of secondary importance. Our chief concern is to discuss the existence of what I shall call "muscular elements" in mental states—that is, elements in the complicated physical substratum of mental states, which themselves arise from centripetal nerve-excitations aroused by contractile stimuli in the muscles. The distinction is a clear one, based on the contention by Prof. James that sensations in themselves separate can never fuse together

<sup>1</sup> *Ueber Bewegungsempfindungen*, 1891.

into another sensation or state of consciousness. "Atoms of feeling cannot compose higher feelings, any more than atoms of matter can compose physical things. The 'things,' for a clear-headed atomistic evolutionist, are not. Nothing is but the everlasting atoms. When grouped in a certain way, *we* name them this 'thing' or that; but the thing we name has no existence out of our mind. So of the states of mind which are supposed to be compound because they know many different things together. Since indubitably such states do exist, they must exist as single new facts, . . . independent and integral, and not compounded of psychic atoms."<sup>1</sup> This view helps us in answering the argument which we are discussing. A red-stimulus causes one sensation, a blue-stimulus another, the two combined a third. But the sensation of red does not combine with the sensation of blue to produce the sensation of purple. The two stimuli do, however, so act together as to produce a brain-process of a third kind, whose accompaniment is the sensation of purple. Similarly we may have no mental states which contain muscular sensations as part of their composition. But we do perhaps have a large variety of mental states into whose accompanying brain-process enter muscular elements. The nerve-processes aroused by the stimuli of muscular contraction unite with nerve-processes from other sources in the production of conscious states which are as unanalysable as a sensation of purple is, when taken by itself, unanalysable into the red and blue nerve-excitations which enter into the total physiological process.

Yet we can easily obtain separate sensations of red and of blue, and detect the resemblance of purple to both of its constituents. How then does it happen that we do not perceive the "muscular elements" as separate sensations? If self-observation does not reveal to us sensations having their source in the muscles, it is because we have never learned to localise them there. To the infant, as Prof. James (i. 496) says, "sounds, sights, touches, and pains, form probably one unanalysed bloom of confusion". Out of this confusion the slow accumulation of varied experience forces him, by means of processes which it is not necessary to analyse here, to recognise the separateness of these different sensations, and to localise them with continually increasing exactness. But the circumstances which compel him to make these modifications for the special senses do not exist in the case of excitations of the sensory nerves of muscles, joints, viscera, and other internal parts. A mental state is analysable only into such elements as can be experienced under other circumstances as separate sensations. There are many reasons why muscular sensations cannot—or can only with difficulty—be so experienced. Exploration by sight and touch, which in other cases aids and necessitates the process of localisation, is here impossible. And

<sup>1</sup> Wm. James, *Psychology*, vol. i. chap. vi.

furthermore another element which compelled the recognition of sights and sounds as separate sensations is wanting here—namely, the importance which this recognition has in increasing our knowledge of our environment, and thus in furthering our interests. As Helmholtz says, we must *learn* to direct the attention upon our separate sensations, and we learn this usually only for such sensations as serve as means toward acquaintance with the outer world. It is of no importance for our practical interests that we should ever distinguish a muscular sensation as such. It is of vast importance that sensory excitations from the internal organs should combine with excitations from the special senses and with their reproductions, into complexes of nervous processes whose conscious accompaniments are feelings of movement, of effort, of spatial magnitude, of emotion, of self, &c. And it is always into such introspectively analysable combinations that the muscular excitations enter. The seen movement, or the visual image of movement when not seen; the spatial distance and direction; the emotional feeling; and the other total mental impressions, are the emphatic and important thing in all cases with which contractile stimuli have to do, and hence these attract all the attention and prevent the components from being detected. When we try to analyse them, the slight intensity of the sought-for elements themselves; the fact that they are almost drowned in the mass of sensations from the skin, &c., which we have learned to recognise apart and to localise; and the absence of the aids which exist in the case of other sensations, prevent a complete and successful discrimination. Thus it is clear why the muscular elements never force themselves upon our attention separately, and why the introspective search for them is difficult. The argument under discussion is not therefore of the slightest weight as a disproof of their existence.

Yet careful consideration does seem to yield some introspective evidence. Almost every unprejudiced observer would locate a feeling of strong tension in the muscle itself. Cramp, the extreme of muscular tension, and fatigue, are very definitely located there. Careful attention to the successive changes in sensation in the different parts which are involved in the progress of a movement, seems to detect faint sensations in the various muscles. And finally Goldscheider<sup>1</sup> has recently shown that, if we make the skin above a muscle anæsthetic and then by means of an electric current cause the muscle to contract, we then experience a faint sensation, whose quality resembles that obtained by pressure on the muscle, and which is localised not in the skin nor in the whole moving member, but in the deeper parts.

2. A second argument urges that, even if sensory nerves were proved to exist in the muscles, they could serve only to inform

<sup>1</sup> *Zeitsch. f. Kl. Med.*, xv., 1889, § 109.

us in regard to the degree of *fatigue* of the muscle. This assertion, however, is disproved by the experiments of Goldscheider and by the introspective evidence just mentioned. The feeling of tension is very different from the feeling of fatigue; and it cannot have its origin in the skin alone, as is shown by many pathological cases, and by experiments in artificial anæsthesia of the skin by Goldscheider<sup>1</sup> and Chauveau.<sup>2</sup> These latter facts, to be sure, do not prevent the assumption of the joints and tendons as the exclusive seat of the feelings of tension. To this question we shall return later. But a further conclusive proof that fatigue-sensations are not the only ones yielded by centripetal nerves connected with the muscles is afforded by certain physiological experiments described below, which tend to show that muscular activity is almost, if not quite, impossible without the regulation afforded by accompanying sensations, either from the skin or from the muscles themselves. And there is no valid reason why we should not assume that separate systems of sensory nerves exist for fatigue and for muscular excitation.

3. An attempt has recently been made by Dr. Waller<sup>3</sup> to show, by means of an experimental analysis of the phenomena of fatigue, that the sense of effort cannot be due wholly to centripetal sensations from the muscles. His reasoning is as follows. The sense of fatigue bears the same relation to the sense of effort as an after-image in vision bears to a direct image. The sense of effort is a sensation accompanying muscular action; the sense of fatigue is a sensation consequent upon muscular action. They have a common cause: the changes which produce the first produce also the second. The seat of both is identical, and if we determine the one we thereby determine also the other. A careful series of experiments proved, in agreement with Mosso's results, that fatigue manifests central as well as peripheral objective signs: if voluntary activity of a muscle be continued until it is no longer possible, direct electrical excitation of the muscle can still evoke fresh work; showing that central exhaustion intervenes before the power of work of the muscle is exhausted. Since, then, fatigue is due to central as well as to peripheral exhaustion, the sense of effort must accompany central as well as peripheral activity. There must be a central sense of motor innervation, which aids in controlling the muscle's movement.

This theory of feelings of central innervation is still much believed in, and receives from time to time apparent support from fresh evidence, such as that of Dr. Waller. We have not space here to discuss it at length, but must refer for a refutation of arguments in its favour to Prof. James' work (ii. 493 ff.), or to the dissertation mentioned at the beginning of this article. The experiments of Dr. Waller, although themselves of great

<sup>1</sup> *Loc. cit.*, § 121.    <sup>2</sup> *Brain*, 1891, p. 153.    <sup>3</sup> *Ibid.*, pp. 179 ff.

value, add nothing to its plausibility. The fault of his reasoning lies in its major premise, which contains three unwarranted assumptions: (1) That the objective signs of exhaustion are always indicative of a previous expenditure of energy in the same parts. That this is not wholly true is shown by experiments of Mosso,<sup>1</sup> which prove that intellectual work, or activity in other muscles, diminishes the power of work of unused and unfatigued muscles. (2) That a subjective sense of fatigue is indicative of a corresponding previous effort, and sense of effort, in the same parts. But the feeling of fatigue located in the eyelid is not at all commensurate with the amount of work this organ has accomplished. It is sometimes excessively strong in the morning, after complete repose of the muscles involved. (3) That objective signs of exhaustion are indicative of a subjective sense of fatigue, and objective signs of effort of a subjective sense of effort, localised in the same parts. If this assumption were admissible, then there would be a shorter way to prove the result at which Dr. Waller arrives. We know without elaborate experiment that the central organ exerts energy; if this is indicative of a sense of effort localised where the effort takes place, then the central sense of motor innervation is proven. But the assumption is not admissible. A sense of fatigue does not necessarily accompany objective exhaustion, nor when it does is it necessarily localised where the objective exhaustion exists. And similarly the sense of effort does not necessarily have its seat everywhere where objective activity is taking place. In Dr. Waller's experiment, the central exhaustion due to moving the finger is not detected by a feeling of mental fatigue, but by the discovery that the peripheral effect no longer takes place when an attempt is made to will it. Careful observation in cases of more extreme mental exhaustion will not reveal any feeling of fatigue localised in the central organs themselves; but will show that a feeling of mental exhaustion, fatigue, sleepiness, is composed largely, probably wholly, of fatigue sensations having their origin in the eyes, eyelids, and various muscles. Similarly a feeling of effort, whether mental or physical, is localised not in the central organs either wholly or in part, but in various muscles of the head and body. Dr. Waller is entirely right in saying that effort and fatigue, the consequence of effort, manifest central as well as peripheral *objective* signs. But this is no indication whatever that they manifest central *subjective* signs. The chemical products of mental and muscular activity, as we have seen, affect the power of work of unfatigued muscles; and doubtless also act as stimuli to peripheral fatigue-nerves, especially of the parts most involved in the feeling of mental exhaustion. And the mental activity itself is felt as an "effort," because it excites activity in muscles, which send centripetal impulses to the brain.

<sup>1</sup> Dubois' *Archiv*, 1890.

There may be this truth in the innervation theory: It is quite possible that no consciousness is possible without accompanying movement; that a cortical cell cannot be aroused to activity sufficiently intense to be accompanied by consciousness without discharging a portion at least of its energy into centrifugal paths. If this theory be true, then every cortical cell would be at once sensory and motor in its nature; and it could exhibit no sensory activity unless at the same time it executed its motor functions. But even then the centrifugal discharge would not be itself perceived as such; the sensation would correspond to the total activity of the cell at the moment of discharge, and this activity would be directly caused in every case by centripetal or intra-cortical impulses. That a centrifugal effect necessarily accompanies it, could only be detected by fresh centripetal impulses which announce the peripheral effect of the centrifugal discharge. There would be no reason to say that the "central innervation" is felt as such, nor would it be so felt any more in the case of a feeling of effort than in the case of a sensation of red or of sweet. But whether this theory is true or false, in every case the "feeling" of effort always results from centripetal impulses immediately following, and aroused by the effects of, the original centrifugal discharges.

4. A remark by A. W. Volkmann is quoted by Prof. James (ii. 198), which claims that "muscular feeling gives tolerably fine evidence as to the *existence* of movement, but hardly any direct information about its extent or direction. We are not aware that the contractions of a *supinator longus* have a wider range than those of a *supinator brevis*," &c. The argument here is directed evidently only against a knowledge of the movement of the *muscle* itself. The muscular feelings are, however, eminently fitted to inform us as to the existence, the extent and direction of movements of the *limbs*. We have already seen that the muscular elements fuse with other excitations into complexes in which they cannot themselves as such be readily recognised. They never occur in isolation, so they have not ordinarily been separated out of the complexes in which they occur, and localised in the muscles from which they originate. And it is quite true that such localisation as is possible can never be carried far enough to do more than inform us in certain cases of the existence, but never of the extent and direction, of the *muscle's* movement. Associated, however, in countless ways into firm compounds with other sensory and representative material, they can be of essential assistance in exactly determining differences in perception of movements of bodily parts, in muscular or mental effort, in attention, in emotion.

5. Müller and Schumann<sup>1</sup> call attention to the fact that to any

<sup>1</sup> "Über die psych. Grundlagen der Vergleichung gehobener Gewichte," in Pfüger's *Archiv*, xlv. (1889) 65 ff.

particular degree of intensity of excitation of muscle-nerves there does not always correspond one and the same particular position of the limb. "Exactly the same pressure on the sensory nerves of the muscles can exist in the case of a high degree of contraction and a slight degree of tension, as exists in case of a slight degree of contraction joined with a high degree of tension." This remark is quite true; but it is also quite true, as every one admits, that we have learned by experience to distinguish exactly between a mere tension of the muscle, unaccompanied by movement, and an excitation which causes the limb to move. "The pure muscular feeling alone is as utterly unable to give any information in regard to the extent or direction of movement, or the amount of resistance, as is a simple sensation to do this in regard to objective properties and things."<sup>1</sup> But each different combination of extent of movement, tension (whether caused by resistance of the antagonists or of outer objects), and rapidity yields a different complex of sensations; and by aid of visual and tactile sensations, we have learned to distinguish and judge these with considerable accuracy. With each particular extent of movement without resistance we have learned by long experience to associate a particular degree of increasing tension in particular muscles, a particular decreasing tension in the antagonists, and a particular amount of rubbing in the joint. Other combinations, of unchanging tension in the muscles and their antagonists, together sometimes with sensations of pressure on the skin, and without simultaneous rubbing of the joint-surfaces against one another, correspond to tension without movement, caused by resistance of the antagonists or of outer objects. If to these latter combinations, with slight modifications in changing tensions, a particular joint-sensation is added, we know that the result is due to a movement combined with antagonistic or outer resistance. In case the resistance is great, tensions are felt in a much larger number of muscles, including those of head, neck, back, and breast. With each particular extent of movement, therefore, the sensations differ according to the resistance. There are similarly other differences in sensation corresponding to different degrees of rapidity. All possible combinations of extent, resistance, and rapidity are thus associated with as many different shades of the sensation-complex. The different sources of the elements of the complex are not regarded; but the total impression caused by their different combinations is recognised and judged.

We thus see that the objection of Müller and Schumann is fully answered. If we had to rely upon sensations from the contracting muscles alone, these would be indeed ambiguous. But this is no longer the case when we consider that our judgment is aided by elements from the antagonists and from the joints,

<sup>1</sup> Horwicz, *Psycholog. Analysen*, i. 204.



which make the total complex different for each different objective combination. We are thus enabled to make allowance for the tension of the muscle, and to distinguish it from the muscular excitation which produces the movement. With one and the same movement of the limb, plus one and the same amount of resistance, is always joined one and the same complex of muscular impressions; and we know with considerable accuracy what part of the complex is due to resistance, and what part to the movement of the limb.

6. This analysis enables us to answer another objection raised by the same authors. They show that if, for example, weights of 600 and 1200 grains were several times raised alternately, and then suddenly, without the knowledge of the subject, one of 800 gr. was substituted for that of 1200 gr., the 800 gr., on account of an adaptation of the motor impulses which had been formed for the 1200 gr., would be raised with great rapidity, and would often be judged lighter than the 600 gr. They conclude that in comparing weights we compare in general only the rapidities of the resulting movements, and think that the more quickly raised weight is the lighter. According to them, this fact contradicts not only the theory of central innervation sensations, but also the theory that muscular sensations inform us in regard to the amount of resistance. "For according to these theories the weights raised with the stronger impulse would appear heavier."<sup>1</sup> In opposition to this theory it can be shown that not the weights raised with the greater impulse, but those which at the moment of raising demand a greater readjustment of the lifting and the antagonistic muscles, appear heavier.

We have seen that the countless different shades of the complex of sensory impressions enable us to distinguish with some accuracy between movement and resistance. But the very fixity of these associations cause also some illusions, when the outer circumstances joined with particular complexes are not the usual ones. In comparing weights according to the method used by Müller and Schumann, the conditions are not the same as in our ordinary experience. The motion is started before the weights are brought to bear, and the endeavour is made to lift both the weights which are to be compared, with the same rapidity to the same minimal height (*loc. cit.*, p. 49). As soon as the weight begins to be felt, the necessary regulation of lifting, of antagonistic, and of other aiding muscles, is made, and the weight rises usually with the desired rapidity to the desired height, and is estimated as accurately as is possible. But if for any reason the muscles are unconsciously "set" beforehand for a heavier weight, then in the moment of actually seizing the weight, there is not the usual gradual readjustment to the amount of resistance. The force of tension already present is almost or

<sup>1</sup> Müller und Schumann, *loc. cit.*, pp. 46-56.

more than enough to overcome the existing resistance, so that the latter when applied offers little or no obstacle to the further progress of the movement; an effect which would be produced if the weight to be lifted were very light, or even if a pull were at that moment exerted on the moving arm. In estimating weights by thus lifting them, we estimate the readjustment of the contracting muscles and of their antagonists which takes place at the moment of seizing the weight; if the readjustment is small, we judge the weight to be small; if large, we judge the weight to be large. We do not make allowance for the already existing impulse, nor for the resulting rapidity, because the conditions of experiment are such that we are ignorant of them. We have no consciousness of the greater strength of the original motor impulse, and judge only according to the effects, for the reason that we endeavour to make the impulses always alike, and that this expectation, together with the fact that the attention is directed not on the impulse, once it is started, but on the readjustment which enables us to judge the weights, induces us to believe that the impulses are alike. Moreover, we have no central sensations of motor innervation which could inform us that the impulses have not fallen out as we intended. The case is similar with the resulting rapidities. These are usually practically alike, when no previous motor adaptation has occurred, and a greater difference than the ordinary average error in judging rapidity may now be disregarded, the attention being fixed on the circumstance which is of importance for judgment—the readjustment at the moment of seizing the weight. Only, if the rapidity happen to be much greater than usual does the experimenter become conscious of the greater motor impulse, and then he either still underestimates the rapidity, or is so surprised at the unexpected result that no sure comparison of the weights is possible (Müller and Schumann, *loc. cit.*, pp. 37, 40, 61).

In this way all the results obtained by Müller and Schumann can easily be explained. The essential point is not that the more rapidly raised weight appears heavier, for the experimenter is unconscious of the difference in rapidity. If we compare two weights which already lie in the hand when we begin to lift it, the heavier one does not appear lighter than the other if it is raised faster, because, before the impulse can commence any movement at all, the resistance must be overcome by a muscular adjustment corresponding to the weight. Too great a difference in rapidity can at the most make an accurate judgment impossible. In the experiments of Müller and Schumann the greater adapted impulse may be revealed to the *spectator* by the greater resulting rapidity. But for the *experimenting person* the essential thing is neither the greater rapidity nor the prepared impulse—he intends to make them alike in both liftings, and must regard them as alike, or at least underestimate the difference, if the illusion is to take place—but the above explained readjustment of the

muscles at the moment of lifting. These authors base their explanation therefore on a factor which cannot influence the judgment of the person experimenting. Their assertion that the muscular changes cannot explain the illusion is a mistake. Without impressions from the muscles the illusion could hardly take place, and then only in case the tendons were able to give an indication of the existing muscular tension.

7. There appears to be no greater sensibility for differences in weight or in minimal movement, when the movements are actively carried out, than when they are produced passively or by faradisation. These facts have been used as arguments against the importance of the sensibility of the muscles.

Bernhardt<sup>1</sup> made the first experiments in raising weights by means of electrical stimulation of the nerve. He did not believe in the existence of muscular sensibility. His own results, as he himself confesses, are not very trustworthy. Ferrier<sup>2</sup> and Goldscheider<sup>3</sup> have since made similar experiments, and found that the estimation of the weight is almost exactly as accurate when the movement is not voluntary, but is produced by electric or by reflex stimulation. Müller and Schumann have also repeated these experiments, with the result "that the painful sensations in the skin produced by the electrical stimulation prevent a comparison of the weights in *raising* them, so that the judgment in regard to the relation of the weights must be founded on the impressions received in *lowering* them".<sup>4</sup>

This lowering of the arm is of course an actively regulated movement, and hence we could hardly expect any great difference in the results yielded by these two methods of estimating weights.

Goldscheider has experimentally shown that the just perceptible minimum of excursion in the case of passive movements hardly differs from that of active movements. This fact, however, proves nothing against the importance of muscular impressions in the perception of movement. Active movements differ from passive not only in the anticipatory image, which precedes and directly causes the former, but also in many peripheral accompaniments. In active movements much more extensive groups of muscles take part; there is a greater degree of tension in contracting and antagonistic muscles, and in the tendons; the joint-surfaces are pressed somewhat more strongly against one another. But in passive movements also muscles are contracted and their antagonists stretched and joint-surfaces glide against one another.

<sup>1</sup> *Archiv f. Psychiatrie*, iii. (1872) 627 ff. "Bernhardt's data have become greatly distorted by quotation" (Waller, *loc. cit.*).

<sup>2</sup> *Functions of the Brain*, pp. 228, 392.

<sup>3</sup> *Archiv f. Anat. u. Physiol., Phys. Abt.*, 1889; *Zeitsch. f. Psych. u. Phys. der Sinnesorgane*, i. (1890) 148.

<sup>4</sup> Müller and Schumann, *loc. cit.*, pp. 62 f.

All the elements necessary for judging the movement are therefore present in both cases, and there seems to be no reason why this judgment should be more accurate in the case of active than in the case of passive movements.

8. Goldscheider found that when he artificially diminished the sensibility of the *joint*, the sensitiveness for active movements was diminished quite as much as for passive movements.<sup>1</sup> He believes that this is a proof that sensations of movement have their origin principally in the joints, and not in the muscles. There is much strong evidence, which these experiments support, that the joint-sensibility is a necessary factor in the accurate perception of movement; but none whatever that it is the only necessary factor. By careful introspection it is possible to obtain a pure sensation localised in the joint, as well as the pure muscular sensation also (compare the experiment of Goldscheider mentioned under 1 above). But each of these is as different from a feeling of movement as the skin-sensations are. Suppose that, as seems probable, a perception of movement is based upon a complex of excitations into which enter elements from joints, muscles, tendons, skin, and other parts, all of these being, however, overshadowed by the visual image of the movement (or in the blind probably the tactile image of the gliding of the limb over surfaces), which they arouse. If now any class of these elements fails, then those which remain might still call up the visual image; yet the normal feeling of the movement would be destroyed, and certain disturbances in judging the movement would necessarily result. That this is the case when the joint-sensibility is diminished and the muscular sensibility retained, is shown by these experiments of Goldscheider. It seems quite as probable that similar disturbances would result in case the muscular sensibility were destroyed and the joint-sensibility retained, although we cannot test this experimentally and know of no pathological cases. Thus neither joints alone nor muscles alone can furnish elements of sensation which would supply the place and do the work of the normal combination of both.

The intervention of impressions from the joints may be necessary to distinguish a mere tension of muscles from an actual movement. But certain facts seem to prove that these impressions from the joints have very little to do with the estimation of the extent of the movement. Of two movements, for instance, which we endeavour to make of equal extent, that one is made in general shorter, at the beginning of which the active muscles are already more contracted. Impressions from the joint cannot explain this illusion, for it is impossible to see how they would differ, whether the arm was more or was less contracted at the beginning of the movement. Loeb endeavoured

<sup>1</sup> *Zeitschr. f. kl. Med.*, xv. (1889) 104 f.; *Archiv f. Anat. u. Phys., Phys. Abt.*, 1889, pp. 496, 542.

to explain it by means of innervation-sensations, but the existence of these it is impossible to admit. By the aid of the muscular sensibility, however, we can fully understand the cause of the illusion. With a given angle of rotation of the limb, the increasing pressure within the muscle would naturally be greater when the muscle is already more contracted than when it is less. Moreover very different groups of muscles take part in the two movements. Therefore, in order to obtain the same sensation of extent in both cases, we must execute movements of actually different extent. This explanation is supported by the fact<sup>1</sup> that the shortening influence is effective only when the distance between the starting-points is sufficiently great to make the degree of contraction of the muscles considerably different in the two cases.

Under 6, above, we discussed another illusion, where weights were underestimated on account of the unconscious adaptation of the motor impulse to a heavier weight. Under these circumstances the extent of movement is also underestimated, as well as its rapidity.<sup>2</sup> This illusion, as we have seen, can be explained by means of the muscular sensibility, but not by means of that of the joints.

So we see that the above objection of Goldscheider offers no reason to question the sensibility of the muscles, and that the latter must be assumed in order to understand facts which the joint-impressions alone cannot explain.

9. With many movable parts of the body—eyes, lips, tongue, &c.—there is no joint connected. Yet by the opponents of muscular sensibility attempts are made to explain without its aid our knowledge of these movements. Goldscheider<sup>3</sup> believes that only the position, and not the movement, of the eyeball is perceived; and that for the tongue there exists only a very slight feeling of position, and none at all of movement. It can hardly be doubted however that we do have very distinct feelings of movement in both. Extremely delicate and accurate movements are demanded of both these organs, but the conscious recognition and judging of these movements as such is of very little practical use, and thus has not been much developed. It is very necessary to know what movements the arm executes; it is not necessary to recognise the movements of the tongue, for it manipulates the food and takes the positions necessary in articulation without requiring attention to be directed upon itself,—consciousness would disturb more than aid in this case.

More serious objections have been raised against the existence of muscular impressions from the eyes. Müller and Schumann<sup>4</sup>

<sup>1</sup> *Über Bewegungsempfindungen*, pp. 98 ff.

<sup>2</sup> *Ibid.*, p. 109.

<sup>3</sup> *Zeitschr. f. kl. Med.*, xv. 117 f.

<sup>4</sup> *Loc. cit.*, pp. 82 ff.

deny that these can explain the delicate and accurate localisations which we make in the field of sight. In the first place, they call our attention to the fact that by one and the same direction of gaze, the gaze can possess a very different fixity,—that is, can be maintained with different tension of the eye-muscles which counterbalance each other. The muscular tension is likewise different, according as we glance along a line rapidly or slowly, and with greater or less fixity. But as we saw above under 5, experience must teach us to make allowance for the amount of tension, since the feeling of greater tension in the antagonists opposes itself to the greater tension of the contracting muscles, and the resulting sensation cannot be ambiguous. To one and the same extent and rapidity of movement, plus one and the same degree of resistance by the antagonists, corresponds always one and the same complex of impressions from the contracting and antagonistic muscles, from displacement of the stimulus on the retina, and from rubbing of the eyeball's surface along neighbouring parts.

We are rarely aware, it is true, of the movements of the eyes, as such, but this is because consciousness of them is of little importance, and they do not therefore attract the attention. The muscular impressions form a complex with the sensations of light, which awakens in consciousness not the idea of a particular position or movement of the eyeballs, or of the excitation of a particular portion of the retina, but the idea of a particular position of the point of fixation in a three-dimensional outer space. The same principle is operative here as that which induces us to regard the complex of impressions resulting from the movement of an extremity, not as such and such contractions of muscles, rubbings of joint-surfaces and excitations of the skin, but as a perception of a particular kind, in which the visual image of the moving limb is the most prominent conscious feature. So here, muscular, tactile, visual and associative factors combine into a product whose business it is to represent in consciousness the outer world and movements in it. Convergence of the eyes is not felt as movement of them, but as nearing of the point of fixation. Their violent movements in dizziness are not felt as such, but as movement of the entire surrounding space. If we shut the eyes and move them, we cannot tell the exact direction in which we will be looking when we open them, because we have never learned to judge accurately the extent and direction of eye-movements as such, uncombined with the more important retinal impressions. Some illusions of movement doubtless exist, which cannot be explained by unconscious eye-movements alone; but they do not disprove the importance of these movements in our representations of outer space.

An observation by Raehlmann and Witkowski<sup>1</sup> is thought by

<sup>1</sup> *Arch. f. A. u. Ph.*, 1877, pp. 462 ff.

Müller and Schumann to furnish absolute proof against the theory which we are defending.

"These two investigators cite the case of a man who had been completely blind for seven years. If he be asked to look toward the right, his eyes move toward the right without divergence. 'If he attempt now to look toward the left, fully associated movements of both eyes occur, but the eyes are turned thereby only to the middle of their orbits, and cannot be brought further in spite of repeated demand. The blind man has the idea that he has carried out the movement toward the left to its fullest extent. Only if a noise be made at the left and the localisation be thus made easier for the blind subject, and then the demand be repeated, can the rotation toward the left be at once promptly executed.' These phenomena disprove therefore completely the theory that muscular or tendon or innervation-sensations bring about our so delicate faculty of localisation."

These facts present no very great difficulties. They can easily be explained if we consider that this blind man mistook a feeling of tension in other muscles for a tension of the eye-muscles, as might easily occur. If we wish to bring about an excessive strain of particular muscles, the impulse may easily go astray, especially in the case of such half-voluntary muscles as these, and we think we are exerting our full force on the muscles in question when in reality a large part of the effort is concentrated elsewhere. In case of strained fixation of a particular point, for instance, we can by careful attention discover the fact that a part at least of the resulting feeling of tension is located not in the eye-muscles, but in muscles of forehead, lids, neck, and various other places; and it is located in these the more clearly, the stronger the strain we exert. In hypnotism it is very easy to prevent the subject from executing particular movements. He makes extreme efforts, contracting thereby other muscles, but thinking that he is strongly endeavouring to execute the movement demanded. Blind persons are naturally much less able to execute and judge eye-movements, than are normal persons whose eyes are closed; and in the latter case, as we have seen, the power is not great. "A person blinded by atrophy of the nerve of sight can never again show energetic movements of the eye, although his whole motor apparatus is intact. Even if he still carry out eye-movements, yet his gaze never loses its well-known lifeless and staring character. . . . A blinded eye squints. Weakness of sight suffices to make the correct co-ordination of eye-movements impossible. The deliberately determined impulse of will is not able to bring about the correct muscular contractions," without the aid of retinal impressions.<sup>1</sup> So it is easy to see why the blind patient under discussion could not execute accurate movements unless some

<sup>1</sup> Exner, *Über Sensomobilität*: Pflüger's *Archiv*, 1891, pp. 604 ff.



actual sense-impression aided him in locating some definite outer point; and how he might easily mistake a feeling of strain originating elsewhere for that which comes from extreme tension of the eye-muscles. The actual position and motion of the eyes, the perception of which in itself is never very delicate, would then easily remain unnoticed. The difficulty of analysing the exact muscular strains which occur in an act of attention, of effort, and in emotional states,—an analysis which only recent psychology has been able to make to any great extent,—shows conclusively that one such strain may most easily be falsely localised and mistaken for another. Such extreme strains however do not occur in the ordinary use of the eye-muscles, and hence this argument against their importance for our faculty of localisation fails. How important they may actually be has been recently established by Münsterberg, who claims that his experiments show “that every change in the movement, position, and use of the eyes makes itself perceptible for the estimation of space-magnitudes in the interpretation of the impression of sight”.<sup>1</sup>

We will turn now to the positive evidence, and examine first the result of histological investigation. Sensory nervous fibres have been discovered, which terminate in Pacinian corpuscles in the sheath and superficial connective tissue of the muscles. As to sensory fibres in the contractile substance itself of the muscle there is no direct histological evidence; the apparent discovery of such by Sachs has been proven unreliable. Golgi<sup>2</sup> discovered a “musculo-tendinous” organ, situated in the zone of passage from the muscle to the tendon, connected with the fibrils of the one and the tissue of the other, and supplied with sensory nerves. His pupil, Cattaneo,<sup>3</sup> also investigated them, and believes them to be the organ of muscular sensibility. “These special organs are situated, like a sort of dynamometer, between the organs which represent the motor power (muscular fibres), and the part upon which this force primitively acts (the tendons).” Since each excitation of the muscle must influence these organs, they might, perhaps, be the only sensory organs connected with the muscles. By means of them, through the processes already described, the distinction between tension and movement-producing excitation of the muscle could be made, and the muscular movements be thus enabled to exert the influence on consciousness which it seems necessary to ascribe to them.

Physiological research has also already thrown considerable light on this subject. Sachs<sup>4</sup> claims that stimulation of isolated

<sup>1</sup> *Beiträge*, Heft 2, p. 166.

<sup>2</sup> *Sui nervi dei tendini dell' uomo*, &c.; Torino, 1880.

<sup>3</sup> *Sugli organi nervosi terminali muscolo-tendinei*; Torino, 1887.

<sup>4</sup> Reichert's *Archiv f. A. u. Ph.*, 1874.

muscles in the frog causes reflex cramps; that some of the intramuscular nerves can be stimulated without causing contraction; that after section of the motor roots degeneration of only a portion of the muscular nerves takes place. François Franck<sup>1</sup> repeated some of these experiments and arrived also at the conclusion that the muscle contains centripetal fibres. Experiments of another kind are even more conclusive. They show that paralysis can be brought about as well by severing the sensory nerve which ends in the region of the muscle, as by section of the motor nerve. The latter, then, cannot function alone; attendant sensory impulses are indispensable to the correct carrying out of the movement, and serve thus as its critical regulation. Bell (1832), Magendie (1841), and others, had already made investigations of this sort. Exner<sup>2</sup> describes recent experiments by himself and Pineles, which lead to the same result: movement is always made impossible, or at least extremely awkward, when the sensibility is destroyed. The dumbness of a deaf person is thus a disturbance of sensibility, and can be removed only if he be systematically taught the touch-impressions of the organ of speech, which can then take the place of the normal acoustic regulation.

In the above experiments, the sensory nerves operated upon supplied the skin and other sensitive parts, not the muscles alone. While they prove therefore that sensory impressions are necessary for motor action, they do not show that these impressions need necessarily come from the muscle itself. But Prof. Chauveau<sup>3</sup> found in the horse two muscles supplied with distinct sensory and motor branches: (A) a voluntary striated muscle, the sternomastoid; and (B) an involuntary striated, that of the œsophagus. Section of the motor branch causes paralysis in both. Section of the sensory branch of A does not suspend response to voluntary stimuli, for being associated with other muscles in its motor functions, the sensory impressions from the muscles whose nerve-circuit is intact are sufficient to bring about the action of the whole group. Section of the centripetal fibres of B always markedly disturbs the motor functions. Electric stimulation of the centripetal fibres of both A and B produces tetanisation (or contraction), but after an appreciable delay, caused by the transmission of the excitation through the nerve-centres. Tetanisation never occurs when, after division of the nerves, we excite the central end of the centrifugal branch, or the peripheral end of centripetal branch. Prof. Chauveau therefore thinks that all muscles are supplied with motor and sensory nerves; and that the terminal filaments of the sensory nerve have probably no

<sup>1</sup> *Dict. encyclopédique* (Dechambre), 2me Série, Tome 12, p. 535.

<sup>2</sup> *Über Sensomobilität*, Pflüger's *Archiv*, 1891, pp. 592 ff.

<sup>3</sup> "On the sensori-motor Nerve-Circuit of Muscles," *Brain*, 1891, pp. 145 ff.

direct relation with the muscular elements, but contribute in forming the preterminal anastomoses or networks of the motor nerves, where they are directly excited by the motor current, and thus aid in forming a complete sensori-motor nerve-circuit, which is necessary for the action of the muscle.

Most of the *psychological* arguments have been directed against the theory of muscular sensations. In showing their invalidity, we have also discussed some facts which offer distinct support to the assumption of muscular elements in consciousness. The introspective facts under argument 1, the experimental under 8, are examples. But there are also many other facts which require this assumption, unless we are willing to accept in our explanations various purely mental activities, which work over the material presented to them in consciousness, and in doing so necessarily interfere with the mechanical continuity of material events. This should be our last resort, not our first one. We should try to base our psychological science on suppositions in harmony with those of the other sciences, banishing from it if possible purely spiritual influence on physical processes, as "vital forces" have been banished from physiology. Only if we find that this basis fails to explain all facts should we abandon the assumption of unbroken material continuity. Whatever our conception of the ultimate connexion of consciousness with its material conditions, whether we regard them as entirely parallel and independent series throughout, or consider consciousness as a mere accompaniment of certain physical processes in the nervous system, or believe that the two are at bottom identical—each of these has been defended in recent psychological literature—we must at all events endeavour to conceive consciousness as in no way interfering with the causally ordered course of material processes, whether in the brain or elsewhere. This conception need not interfere with the demands of our moral convictions, for many of the world's deep thinkers have founded, and are still founding, on this basis ethical and religious systems.

But this conception becomes possible only on the assumption of sensory elements from the muscles, which arouse in us our feelings of psychical activity. To each psychical fact must correspond some physical fact in the nervous system: As the physical excitations in the brain are all aroused by centripetal excitations and the revivals of previous centripetal excitations, so consciousness must be composed wholly of sensations and the reproduction of sensations in memory. If this be true, it is impossible to understand all the content of our consciousness unless the state of the muscular system is somehow represented in it. To each idea must correspond some complex of centripetal excitations, either immediate or associative, or both. As the idea of Self is based largely on the great mass of excitations from all the internal organs, and such faint ones from the special senses as remain un-

noticed in themselves, so muscular elements must form the texture of all feelings of emotion, of activity, of effort, attention, volition. They must be joined with others in all perceptions of movement. The original vague feeling of extensity demanded by the nativistic view of space-perception must also have its physiological concomitant, and this can be no other, in the case of visual space, *e.g.*, than the complex of feelings of accommodation, of muscular changes, &c., which are joined with each retinal impression, and which must precede all definite idea of movement, and all orderly classification of space by means of movement. Other feelings still more vague, so many of which exist—perhaps even the feelings of tendency and transition, which Prof. James describes—may very likely be in part, aside from purely cerebral elements, feelings of muscular attitude. In fact, out of muscular elements is built up a large part of our mental life. That the compounds into which they enter are so different from the separate elements when perceived alone is not surprising. Consciousness is full of such cases. Just as  $H_2$  and O when combined produce very different effects on consciousness from those of each component alone, so a combination of centripetal excitations may give rise to a mental state utterly different from the sensations which result from the presence of each alone. In this way a perception of movement, or an emotion, is as different from the single sensory and associative elements which enter into it as a sensation of purple is from one of blue or of red. It is a part of the task of psychology to find the peripheral sources of the various elements which compose a total excitation, for only in this way can it fully comprehend the nature of mental states. And it must fail in its search, unless it admit that the muscles are the peripheral sources in a large variety of cases.

All this must necessarily follow, I repeat, if we accept in any of its forms the theory that consciousness in no way interferes with the causal chain of events in the physical world. But even if we are unwilling to go so far, and insist on allowing to consciousness some degree, large or small, of such materially effective influence, yet there still remains much evidence that muscular elements are significant factors in our mental life. The objections to this theory, we have seen, are not tenable, and there are many positive reasons for accepting it. Moreover, we see also that a sufficient anatomical basis for the theory has already been established. By Chauveau's theory the state of the muscle might be revealed by the direct effect of the motor current on sensory nerves. The musculo-tendinous organ is admirably fitted to furnish similar information. It is not impossible however that sensory nerves may be found to end within the muscle itself, instead of in the preterminal network. In any case the important thing is that in some way muscular excitations influence the cortical centres, and that it be possible to distinguish between an excitation which results in tension, and one which produces movement. There is sufficient reason to believe that this occurs.

DR. MÜNSTERBERG AND HIS CRITICS.

By E. B. TITCHENER.

In my recent criticism of Prof. Münsterberg's *Beiträge* I attempted to show, firstly, that the author was guilty of gross inaccuracy in his psychophysical experimentation, and that the theories which he based on this latter were therefore so far valueless; and, secondly, that he had not correctly represented the views against which he polemises. In the last number of *MIND* Mr. Alexander replies to my objections mainly from the side of theoretical psychology; in other words, defends Prof. Münsterberg's hypotheses against an attack which I had no direct intention of making. He has, I fear, been misled by the fact that I offered alternative explanations of the *Beiträge* results. On these I would lay no great weight, in face of the generally imperfect record of the experiments, and the nature of those which are more completely described. In my present remarks I shall only refer in this connexion to my interpretation of the reaction-times of pt. i., which Mr. Alexander has misunderstood.

In the research on the Time-sense occurs the following sentence: "Die Frage, aus welcher Quelle unsere Spannungsempfindungen, unsere Bewegungsgefühle stammen, ist bekanntlich noch Gegenstand lebhafter Discussion."<sup>1</sup> This passage is, I think, a sufficient answer to Mr. Alexander's note upon my treatment of the 'muscle-sense' question as handled in the *Beiträge*.

I. The expression 'automatic co-ordination,' for which, perhaps, 'fixed association' would have been better, referred to the practised connexion between category and finger. In this respect the 'muscular' reactions were not muscular at all; for the preparation consisted not simply in the idea of the movement to be carried out, but in the idea of the connexion between this and the appropriate category.<sup>2</sup> The large number of false reactions, which in this case rose to 25-30 p.c., is a result which on a calculation of probability points to a purely accidental subsumption of the called word to its particular category. That the number of these false reactions did not amount to 50 p.c. of the whole number of experiments is easily explicable. A correct association between the stimulus-word and the practice-category merely presents the relatively most favourable case out of the various possibilities. If Mr. Alexander really maintains that the experiments suffice for the conclusion which Prof. Münsterberg has drawn from them, one can only suppose that the conclusion weighs more with him

<sup>1</sup> *Beiträge*, ii. 20; cited in my former paper. The italics are mine.

<sup>2</sup> i. 76.

than the experiments. For as regards the latter two things seem certain: (1) that the constant difference in the times is to be referred to the above-mentioned difference in preparation; and (2) that the large number of false reactions is an inverse measure of the advantage which a correct subsumption of word to category possesses in the developed consciousness.<sup>1</sup>

II. In the sentences quoted by Mr. Alexander from my remarks upon the Time-sense investigation, I had intended to use the phrase 'concentration of attention' just in Prof. Münsterberg's sense. I do not think that the subject becomes clearer if I write: 'the condition of the psychophysical organism is that of strain-sensing a strain-sensation'.<sup>2</sup>

III. I am far from denying that eye-movements took place in the Attention-experiments; but the point should have been verified. I pointed out how easily this side of the investigation, so important for the theory, could have been carried out.<sup>3</sup>

V. The strain-sensations of the study of Localisation by the Ear are, of course, hypothetical, as Prof. Müller pointed out.<sup>4</sup> I think that Mr. Alexander has overlooked the word 'practically' which qualified my equations. Granting the possibility of the sensations, we have for  $90^\circ \text{ H} = 270^\circ \text{ F}$  (the instance which he

<sup>1</sup> (a) When I wrote that the beginning of the association-process before the calling of the last word of a sentence was a fatal weakness in the experimental method, I was, of course, thinking of the time-results. What psychophysical processes does Mr. Alexander suppose these to cover? The control which he assumes for their validity I had expressly called in question. (b) I readily admit that Mr. Alexander has given the correct interpretation of the passages, pt. i. 73. Prof. Münsterberg's *ὑστερον πρότερον* had misled me. (c) As regards finger-movement, I do not see that the experimenter has any control; that the reagent can be deceived I can affirm from my own experience and from that of others. (d) I cannot find in the literature any note as to the percentage of false (simple) reactions, which occurs with use of the muscular method. In my own experiments (*Phil. Studien*, viii. 140, tab. i.) the false and premature reactions taken together amounted to 8 p.c., and I am told that this is rather a high than a low percentage. I have not maintained that "the constancy of the muscular reactions is due to perfect practice," either as regards the simple form, or that of Prof. Münsterberg.

<sup>2</sup> (a) Mr. Alexander can hardly mean seriously to maintain that a constant error does not affect results which are to be turned to relative account. (b) I had thought to show, by the use of inverted commas, that my objection to the collocation "timeless pause" was verbal. From a page bristling with factual objections, Mr. Alexander has selected just this one!

<sup>3</sup> Why is the attention necessarily relaxed, in the Helmholtz experiments, if it is subject to oscillations (rise and fall)? The point is, that as the threshold for the moving eye is lower than that for the resting eye, the question of the appearance of the oscillations should be determined for this lower threshold.

<sup>4</sup> *Götting. gel. Anzeigen*, June 1, 1891, p. 423.

has chosen) an extremely easy +-movement and a very difficult -movement (thresholds *a* and *b*) for H, and two moderately difficult movements (thresholds *c* and *d*) for F. Yet  $a = b$ , and  $\frac{a+b}{c+d} = 3$  or more. In the case of  $180^\circ \text{ H} = 270^\circ \text{ S}$  the relation of the thresholds, 10 : 1, appears to me on the author's theory quite unintelligible.<sup>1</sup>

VI. The first thing to notice in Mr. Alexander's remarks upon the *Neue Grundlegung der Psychophysik* is his own instance of an equating of disparate sensations. We equate the taste-sensations derived from a bottle of champagne and the hearing-sensations of a Joachim concert—*through feeling!*<sup>2</sup> But where is this stepping-stone mentioned by Prof. Münsterberg? In his experiments it is a sensational comparison which is in question.

The position that there is no change of standpoint in the handling of the muscle-sense between the second and third *Heft* can hardly be maintained in face of the text itself. According to the second theory, a muscle-sensation can be said to increase in intensity, in that it lasts longer. But how can it decrease in intensity? It cannot begin to last less long. Yet this decrease is possible on the Time-sense view.<sup>3</sup> One is therefore, I think, justified in saying that in the latter connexion the word 'intensity' has its ordinary psychophysical significance.<sup>4</sup>

<sup>1</sup>(a) Mr. Alexander says that in this case the experiments themselves are not called in question; but cf. my former paper, *MIND*, xvi. 526, 528.

(b) The one-ear threshold at  $90^\circ \text{ H}$  should have been larger than that at  $180^\circ$ , because in the latter case the head has only to turn a quarter-circle, in the former a half-circle, to bring the open ear opposite the source of sound. (c) In Docq's theory it is the relative intensity which is in question. (d) The static sense is of supreme importance for fishes. That they possess 'canals and no cochlea' is not strictly correct: cf., e.g., Waldeyer's schematic diagrams in Stricker's *Gewebelehre*. Positive arguments for the connexion of the canals with orientation of the body are brought, among others, by Cyon (*Gesamm. physiol. Arbeiten*, 1888). Sewall (*Journal of Physiol.*, 1884) and Steiner (*Funktionen des Centralnervensystems*, ii. 1888) obtained mostly negative results; but Breuer (*Pflüger's Archiv*, xlviii. p. 243) remarks that their experiments demand repetition, and hints at inaccuracy of observation. In the case of birds, which is closely parallel with that of fishes, the results seem hardly to admit of two interpretations. For recent physiological opinion as regards man, cf. Waller, *Human Physiology*, 1891, p. 458; Kreidl, *Pflüger's Archiv*, li.

<sup>2</sup>"We compare the amount of enjoyment they give us;" pp. 258, 259.

<sup>3</sup>*Beiträge*, ii. 25, iii. 33.

<sup>4</sup>Prof. Müller and Dr. Martius can, of course, take care of themselves; I am only concerned here to meet the objections which Mr. Alexander urges against my own criticism. But it is, I think, a little gratuitous to suggest, as he 'speaking not as an expert' does, that Dr. Martius is guilty of a confusion between "the intensity of the sensation and the amount



A comparison of Mr. Alexander's reply to my criticism with the criticism itself will show how small a part of the objections there raised has been taken into account by him. The above brief remarks meet, I believe, all that he has urged on the positive side. The whole character of my first paper excuses me from discussing at length his subjective estimation of the theoretic value of Prof. Münsterberg's work.

### THE DEFINITION OF DESIRE.

By HENRY RUTGERS MARSHALL.

Prof. Henry Sidgwick in the January issue of *MIND* draws attention to a difference between himself and myself as to the analysis of Desire and Aversion, as expressed in my article in *MIND* for October, 1891. So careful a record of his own introspective observation as he here gives us must be of service to psychologists at large. I feel personally indebted for this clearer expression of his position.

Had I been more cautious I might have strengthened my position by reference to Dr. James Ward's article "Psychology" in the *Encyclopædia Britannica*, or by adding to the definition which Prof. Sidgwick quotes the words italicised in what follows, making it read thus: "*Typical cases of the state which we call desire . . . clearly involve a very important thwarting of the impulse to go out towards an object,*" &c., &c. The pains of obstruction were under consideration and the typical desires (which Prof. Sidgwick acknowledges to be most frequently painful) were the only ones to which reference was necessary.

At the outset I must be allowed to say that although the words "thwarting of the impulse to go out towards an object" may possibly, as Prof. Sidgwick says, "be taken to imply that action *for the attainment of the desired end is prevented*" (p. 96), I personally would not defend such an interpretation of my phrase, as Prof. Sidgwick understands the words, for according to his usage, apparently, what he calls the "Action for the Attainment of the desired End" may refer to a long series of activities, perhaps the outcome of an original desire and tending indirectly to bring the results which would have been reached by immediate satisfaction of that desire.

In such cases the complex activities (*e.g.*, the feelings connected with climbing) initiated by the desire (*e.g.*, to reach the mountain top) are in my view quite apart from the original desire, and if

of the objective stimulus," and between "time as measured by the clock, and the sense of time as dependent on muscular sensation" (pp. 258, 259).

these latter be obstructed may bring forward a new desire altogether (*e.g.*, the desire to get a hold upon some tree branch to assist in the climb).

I think, in fact, that the main point of difference between Prof. Sidgwick and myself will be found just here. In almost all, if not all, psychoses of reflexion upon desire we find the state itself "combined with other prominent elements of feeling," as Prof. Sidgwick puts it; and in viewing complex mental states with which desires have once been combined we at times allow the name "desire" to cling to a psychosis after all real desire has ceased to be a component of it. To use Prof. Sidgwick's illustration: One unaccustomed to games involving bodily exercise finds the play tedious at first, because it is obstructive of many activities which would normally arise. When once he reaches a desire to win, the components of his mental state change. The impulse to activity is followed by muscle feelings and intellectual elements that absorb attention. This absorption leads, I think, to the exclusion of the psychosis of desire which initiated the active state, and in reflexion we find in truth no pain, for the desire itself has ceased to be a component of the psychosis. We are dealing, in my view, with a psychosis other than that of Desire. Surely this is the case when the so-called desire is "accompanied by hope, and when, though action for the attainment of the desired object is not possible, still some activity adequate to *relieve the strain on the nerves* is possible" (p. 97). The italics are mine.

To take another of Prof. Sidgwick's cases: The prisoner desires to be free, but the moment he begins to use his file the content of his consciousness surely changes; the predominant elements are now determined by activities looking to the breaking of the bars and perhaps alternate with thoughts of delightful prevision. The original desire may arise momentarily, but I cannot avoid the conclusion that we must postulate the existence of a feeling "which the person feeling it does not recognise as such," if we are to hold that the original desire remains a component of the psychosis through all this shifting of field, as Prof. Sidgwick seems to imply. (Note especially p. 99, l. 34 ff.) When the prisoner reflects upon his pleasurable state of mind, is the desire for freedom part of the complex? I think not.

In the case of hunger I am inclined to think that, in describing "appetite" we do not, in ordinary cases, discriminate with sufficient care between the craving and the voluminous and vivid feelings coincident with the wide and very active functioning which ensues at once when food is put into the mouth.

The remaining instance given by Prof. Sidgwick is perhaps less clear. As desire involves capacity for pleasure in its satisfaction, the novelist uses restriction of plot development to serve as a mark that pleasure will be forthcoming. I think here it may be held that the desire has disappeared with the rise of the pleasur-

able excitements connected with the plot development. The desire is certainly not clearly developed unless an obstruction to the flow of thought occurs. If the reader look at the final chapter immediately upon the suggestion that the outcome will there be found, I think desire can scarcely be said to have arisen at all. It appears in a distinctly "uneasy" form only when we restrain the suggested activities and do not look forward. This case may indeed be looked upon as typical. Psychic trains which have appeared as the outcome of desires may at other times arise without any anterior desire; each element following immediately upon its associative suggestion without any thwarting. If, however, these trains have been notably connected with desire, we find it difficult to disassociate them from the desires. In other words, in reflexion we are likely to ascribe to desire activities which have been mere normal associative developments.

It is with no wish to be polemical that I have written thus more at length than is perhaps warranted by any interest attaching to my own opinion as opposed to that of Prof. Sidgwick, but because I feel that he can render us a still further service in this direction. The point I would make is this. Typical desires certainly contain the feeling of a "thwarting of the impulse to go out towards an object" and are painful. This Prof. Sidgwick acknowledges. Further, so far as I can judge, the reduction of the width and vividness of the field which is thwarted reduces the force of desire and also its painfulness. It seems highly probable, therefore, that the thwarting and its pain are of the essence of desire and not mere accidents. The probability of the correctness of this view is increased by the fact that, in those cases of so-called desire which appear to be pleasurable or neutral, new psychoses are involved which are made up of emphatic elements other than the desire proper.

If such complexes as Prof. Sidgwick instances are to be called desires, then certainly psychology stands in need of names for the elements which we are able to discover in these complexes. Progress in psychology as in all other sciences must come with, if not through, definiteness of terminology, and there is danger that advance may be restricted by clinging too closely to common-sense significations of terms which have come into use previous to advanced analysis. If we cannot limit existing terms to the essentials of the complex states to which common-sense applies them, we must needs invent a more refined terminology.

If it be improper to restrict the term desire to states which contain the feeling of thwarting pain referred to, then we surely require a word to describe this special state, separable as it is by introspective analysis, but which has no term applicable to it in psychological terminology other than this very word desire.

One more point, I think, may be emphasised as possibly accounting for the differences between Prof. Sidgwick and myself. Prof. Sidgwick acknowledges that all desire is an "uneasy" state.

If, then, desires are pleasurable or neutral, he must hold that uneasiness may be pleasurable or neutral. This does not accord with my own experience, and I do not think it will be found to agree with the experience of the average man.

In closing, let me say that I hope never to be found using the mists of sub-consciousness as a shelter from objections; this one word of personal explanation seems to be required, and is, I think, sufficient reply to Prof. Sidgwick's question, p. 96, l. 4.

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### FEELING, BELIEF, AND JUDGMENT.

By J. MARK BALDWIN.

In the review of my *Handbook of Psychology* in the last issue of *MIND* (N.S. No. 2, p. 272), Miss Lowndes touches upon a point or two of such importance that further discussion of them may be interesting, apart from my desire to be clearly understood. The nature of Feeling in general, and the relation of Belief to Feeling and to Judgment, are both problems of capital interest.

First, briefly, what is Feeling? For what follows, let us understand by Feeling simply *sensibility*, the amount, intensity, agitation, of consciousness. It is consciousness itself, a "first intension"—consciousness in its simplest expression, but consciousness as present, also, in the highest operations of knowing and willing. The mollusc—and perhaps the sensitive plant—does not know anything, nor will anything, but it feels.<sup>1</sup> As a matter of fact, we find that we feel differently during the predominance of different mental functions. When I am striving and straining, my state of feeling is very different from my state when I am listening passively to an uninteresting lecture, and both states differ greatly from such an emotion as anger. Now the second question which I wish to ask is this: how do we feel when we believe—when an article of faith is just becoming an article of faith?

As to the general theory of Belief, I must refer the reader to my book (ii. chap. vii.). What I wish to point out here is that after the elements brought out by analysis have been assigned to their proper categories (impulse, volition, presentation, &c.),

<sup>1</sup> This conception is clear enough, it seems to me, especially when viewed from the biological side. Yet Miss Lowndes charges me with limiting Feeling to egoistic Emotion (*loc. cit.*, p. 274). In saying that Feeling has "reference to self" (*Psychology*, i. 36), I do not mean, of course, the *presentation* of self; but simply the conscious area, the inner aspect, belonging to my organism. In the very same sentence, I say, "states of feeling may be entirely lacking in the presentation or knowledge element". Miss Lowndes' criticisms rest, for the most part, on evident misapprehensions such as this.

what is left over ultimately is a feeling-moment. There is impulse in Belief : all things believed belong to certain categories, have certain coefficients, toward which we feel, for consciousness at least, original impulses, and after which we consciously strive. There is likewise presentation or representation, usually both, in Belief ; for we believe a content, an objective. But impulses, representations, and volitions might be present to eternity without Belief. Note the vegetative biological satisfactions of the new-born, our voluntary performances of organic functions, and, in a higher sphere, the objects of our ethical and æsthetic gratifications which remain largely a matter of uncritical and unreflective presence—what I call reality-feeling. We stumble upon the beautiful and the good, and they please us ; but their presence, and our gratification from their presence, do not afford us any criterion (coefficient) by which we may accept them as beautiful and good. Now, admitting that the acceptance, endorsement, ratification, of an objective is necessary to constitute Belief, shall we call it Judgment with Brentano, and on the strength of its priority, make Judgment a mental category co-ordinate with Presentation (*Vorstellen*) and Feeling ; or shall we attempt to analyse it farther ?

The need of such an analysis is seen in the conflicting views of Judgment, logical and psychological, now current. As it happens, in the same number of *MIND* (N.S. No. 2), reviews occur of two books which bring out the current divergence of view, *i.e.*, Erdmann's *Logik*, and Hillebrand's *Die neuern Theorien der kategorischen Schlüsse*.<sup>1</sup> Hillebrand accepts Brentano's view of Judgment and develops it in its logical bearings. This view is in my opinion undoubtedly psychological in two of its factors : (1) It emphasises an aspect of existential judgments which is not covered by the ordinary predicative theory ; namely, if existence is a predicate in the ordinary attributal sense, it must have a notional content of its own—it must be itself a content, an earlier presentative experience : an error which Kant refuted once for all in his criticism of the Ontological Proof. But the formal logicians (*i.e.*, Erdmann), reply : if existence is not a predicate, the distinction between presentation and judgment is subverted. This last is unanswerable, but it leaves unrelieved the acute strain between the psychological and logical views of the existential, which troubles the soul of Brentano. (2) The Brentano-Hillebrand view does justice for the first time to the *unitary* or *conceptual* meaning of Judgment and Syllogism ; a point of view from which the formal "two-membered" doctrine of Judgment is the hollowest of mockeries. When I say *the dog is fierce*, my content is a single object, *fierce dog*—this much

<sup>1</sup> Reviewed respectively by Mr. Bosanquet and Miss Jones. In what I say of these two books I am depending upon the reports of the reviewers : I have not been able yet to secure the originals.

certainly, whether or no we go over to the existential view which says *the fierce dog is* is equivalent to the original statement.<sup>1</sup> Indeed, as I understand Brentano, he does not go over to the existential view, thus saving himself from the criticisms to which that doctrine is open, at the same time that he has cut himself off from a predicative doctrine by his unitary view of the judgmental content.

Yet it is curious to note how the logical progressus of doctrine may be reversed. Erdmann—as represented by Bosanquet—holds the predicative theory, yet maintains the unitary view properly belonging to the existential theory. This he does by upholding what may be called the *declarative*, as opposed to the synthetic function of Judgment. Here, I believe, Erdmann is right. As I have argued in my book:<sup>2</sup> “the essential feature of Judgment is this, that it sets forth, in a conscious contemplative way, the actual stage of the thought movement”. But how easy it would be to reverse this chain of argument, and to say that because there is this declaration of relationship between parts of the objective whole which is the content of Judgment, there must have been originally more than one content, and Judgment, as a synthetic thing, precedes presentation and renders it possible.

The view of Judgment which is desiderated, therefore, should have the following features: first, it should find some way of holding that existence is a true predicate and yet not an attributal content; second, that the content of Judgment is a single concept; third, that reference to existence accompanies all Judgment; and fourth, that Judgment is declarative of results already reached in Conception. The first and third of these four points are essential in this connexion, and it is to meet them, and thus to reconcile the existential and predicative theories of Judgment, that I present the following considerations.

On the first point, the nature of the existence predicate, I think consciousness throws very clear light. Reality is at first simply presence, sensation, presentation; we have here the fundamental phase of affective consciousness, reality-feeling. There is no Judgment here at all, because there is no occasion for assertion. There is no acceptance of reality as such, because there is no category to put it into. But now let experience come in like a flood, let pleasures of gratification be succeeded by pains of want, let impulse seek its end, finding it here and losing it there; and amid the contradictions and reiterations, the storm and stress of the accommodation of life to the world, a few great relief-points begin to stand out in consciousness. They recur, they satisfy, they stand together, they can be found when wanted. They are not new as objects of apprehension; they are the same objectives as before. But somehow, after we have gratified our appetites

<sup>1</sup> Cf. my *Psychology*, i. pp. 285, 301.

<sup>2</sup> i. 283, 285.

by them, and have sought and found them, again and again, standing firm together, while other objectives have shifted, faded, and disappeared—then the mental part of us which envelops them becomes different. Our affective consciousness now assumes the colouring which we call Belief; that sense of acceptance, assurance, and confirmation which succeeds doubt and perplexity. Now this is Feeling; a feeling of the methodical way in which certain objectives manoeuvre in consciousness, in contrast with the unmethodical way in which other objectives manoeuvre; the feeling of a reality-coefficient.

This, then, is the primary meaning of Belief in reality or existence. It is a sense of the confirmed presence of an objective, as satisfying the demands of my conscious life. So far, Belief is not Judgment, and Existence is not an Idea. But as soon as such an objective gets labelled as real, gets pictured with this coefficient, then the declarative, assertive phase of consciousness arises, and the *S is* is born—a true predicative Judgment. What was before the feeling = envelope, so to speak, of the presentation, is now itself presented as part of the content. Hillebrand is right in saying that the idea of existence does not arise before, but in and through, the existential judgment.

In the existential predicate, therefore, what we assert is not a content for consciousness, but the feeling-category in which the *S*-content is enveloped in consciousness: the way consciousness feels in consequence of the presence of this particular content in it. This is, I think, the true explanation of the existential. It is a judgment, because in its declarative function it renders in intelligible form the endorsement which distinguishes Belief from simple presentation. But the predicate is only a sign of this endorsement, not an added element of objective experience.

The other desideratum of our theory is now clearly in sight, *i.e.*, the presence of an existence-value always in Judgment. As experience broadens, our reality-coefficients are so well established as categories of feeling consciousness, that each presented content has its familiar envelope of Belief, its endorsement in kind—so familiar and natural that it is not formally asserted at all. And the new marks which accrue to a content in conception get declared in the ordinary “two-membered” form of judgment, all inside of a tacit (felt) reality-coefficient. The *is* of “the man *is* white” is, therefore, very different from the *is* of “there *is* a white man”. The former is merely the sign of conceptual synthesis: the judgment might be true in any “world of reality,” *i.e.*, of Adam Bede. The existence-value of the judgment is simply the environment of feeling which an accepted proposition carries with no indication of any particular kind of existence. But in the true existential (“there *is* a white man”), the feeling factor is taken up as a logical predicate, and the coefficient of reality (external existence) is declared. The *is* now expresses conscious ratification and declaration of Belief.



The employment of the belief criterion as a norm of classification of judgments<sup>1</sup> is, I think, fruitful in further confirmation of this general result. If we look at the belief-attitude of the mind in cases of assertion, we find two clear truths not brought out by the ordinary division of the Logics. First, the disjunctive is seen to be a categorical form of expression. The disjunctive form of P means that the same belief-feeling accompanies either of two or more declarations concerning S. It expresses the belief-value of the concept S as far as constructive experience of it (*i.e.*, the evidence) is of value for belief. With more evidence, the parity of P and P<sup>1</sup>, as claimants upon belief, disappears, and the judgment takes the regular categorical form. Second, the hypothetical lies with reference to belief midway between the ordinary categorical and the existential. We may approach it from either extreme. For example, the judgment *if a is b, c is d* means that the same degree of reality, or belief-feeling, accompanies the conceptual synthesis *ab*, on the one hand, and the synthesis *cd*, on the other. But it does not determine, just as the ordinary two-membered judgment does not, the particular coefficient of reality belonging to either *ab* or *cd*. Or we may approach the hypothetical from the side of the existential, getting the hypothetical judgment of existence, *if ab exists so does cd*. In this case not only does the belief-feeling envelop both *ab* and *cd*, as before: but, farther, the particular coefficient of reality attaching in common to them both is now expressed. This last form of judgment is therefore, from our present point of view, the richest and most notable. In it we catch both Belief as felt coefficient, and existence as asserted predicate (*i.e.*, the reality-coefficient made object of predication).

The above account, it will be seen, gives ready explanation also to the negative existential judgment—a point of great difficulty to Herbart, Brentano, and Hillebrand—by saving the predicative force of the existence sign. Yet by the negation in this judgment, as now explained, no element of content is cut off from S; what is denied is Belief in the coefficient of external reality.

The element of Belief which accompanies all Judgment, described above as felt recognition of a reality-coefficient, gives us, in my view, the line of connexion between formal and material Logic—a connexion which logical theory greatly needs. The judgments A, E, I, O, can not be purely formal, nor can the syllogisms constructed from them; for every S and P in each one of them has its belief-value—its reality-coefficient—and every actual case of inference means the development of concepts subject to the limitations of thought in that particular sphere of reality. This reference to reality is probably what Hillebrand is contending for in his doctrine of "Double Judgments," as far

<sup>1</sup> Suggested in my first edition, *Psychology*, i. 293 ff.

as I understood the brief reference made by his reviewer.<sup>1</sup> The truth of every conclusion rests upon the presupposition that the two premises have the same kind of reality. The syllogism:—

$$\begin{array}{l} A \text{ is } B \\ B \text{ is } C \\ \hline A \text{ is } C, \end{array}$$

to be valid, really requires belief that the proposition *If A is B and B is C, then A is C* applies to the particular elements of content in question. Without this presupposition<sup>2</sup> securing the same coefficient to both premises the conclusion would be false; as for example:—

$$\begin{array}{l} \text{All men who have died will rise again,} \\ \text{The man Romeo died,} \\ \hline \text{The man Romeo will rise again.} \end{array}$$

The "man Romeo" and the "all men" have different coefficients of reality.

But I do not care to discuss logical points. Enough has perhaps been said to show that the doctrine that Belief is "Ideal Feeling" has psychological warrant, and helps us considerably in the theory of Judgment. Nor is it worth while to point out the points of divergence from Hume's doctrine of Belief: the points of similarity will be sufficiently apparent to students of Hume.

<sup>1</sup> MIND, *loc. cit.*, p. 279.

<sup>2</sup> It is by supplying this presupposition of Belief that the hypothetical syllogism arises, just as the hypothetical judgment arises from the supplying of the ground of Belief in the categorical judgment (*cf. Psychology*, i. p. 303).

## VI.—CRITICAL NOTICES.

*The Human Mind.* A Text-book of Psychology. By JAMES SULLY, M.A., LL.D., Examiner in Mental and Moral Science in the University of London. Author of "Illusions," &c. Pp. xvii., 501, 390.

This book is exactly what it claims to be—a text-book. If we compare Mr. Sully's work with the *Principles* of Professor James we are impressed by the contrast between them. James' book teems with novelties of matter and of statement aggressively obtruded on the reader's attention. The chief aim of Sully, on the other hand, is to give a clear and full exposition of the net result of psychological investigation up to date, avoiding polemics as far as is practicable. We do not mean to imply that original matter is not to be found in Mr. Sully's book. In many places he makes a distinct advance on the work of his predecessors. But such improvements are quiet and unobtrusive. They do not constitute the leading feature of his book. In respect of arrangement Sully is immeasurably better. His work is a systematic whole, whereas it is scarcely an exaggeration to say that James' chapters may as well be read backwards as forwards or in any other order. In terminology also Sully has greatly the advantage. He does not bewilder us by making such words as *feeling* and *thought* mean anything and everything—*i.e.*, nothing at all. Mr. Sully's style is entirely wanting in the vigorous and vivid rhetoric so characteristic of Professor James. But it is more definite and accurate. Finally, Sully is much more self-consistent than James, who is so carried away by his consuming interest in each topic as it arises that he at times appears to forget what he has said in treating of other topics. In short, although James has written a great work he has not written so good a text-book as Sully.

Sully divides his book into five parts. Part i. discusses the aim and scope, the data and method of Psychology, and the physical basis of mental life. These topics are treated on the whole in a very satisfactory way. We must protest however against the statement that the assumption of an ego or subject is extra-psychological. The reason assigned is that the psychologist as such has to deal only with psychical phenomena, and that the ego only becomes a psychical phenomenon when it becomes a factor of Consciousness, that is to say, in self-consciousness. By parity of reasoning it would be better to deal with Association only at the stage in which the subject comes to reflect on the connecting links which determine the succession of his ideas.

The general order of treatment adopted by Mr. Sully appears to us to be on the whole the best both from a theoretical and a

didactic point of view. He deals successively with primitive psychical elements, processes of elaboration, and stages of production, in the case of Intellect, Feeling and Will respectively. Under the first head come sensations, sensuous pleasures and pains, primitive movements, and those psychophysical connexions which are predetermined from the outset by the nervous organisation of the individual. The elaborative processes are in the case of the intellect, Attention, Differentiation, Assimilation, and Associative Combination. In the case of feeling and of volition there is said to be a "double process" analogous to intellectual differentiation and integration. These processes and materials yield the products or developmental stages of our mental life, *e.g.*, the space perception, conceptual thought, the aesthetic and the moral sentiment, purposive action, character, and so forth.

Part ii. treats of materials and processes. Chapter vi., which deals with Attention, is clear, full and judicious. Attention is defined as "mental activity immediately resulting in a raising in point of intensity, completeness, and definiteness of certain sensations or other psychical phenomena, and a corresponding lowering of any other simultaneously presented sensations, &c."

Mr. Sully brings out clearly and well the essential and universal importance of this process in our mental life, showing how it conditions the other elaborative processes of Differentiation, Assimilation, and Integration. The main deficiency in his treatment of the subject lies, we think, in his omission to discuss the nature of the operation by which we fix attention on general topics as distinguished from that by which we fix it on concrete percepts and images. Motor activity can be immediately effective only in the latter class of instances, as in calling up and detaining a mental picture. But we often by a distinct effort of will turn our thoughts to, or withdraw them from, such general topics as business, religion, the theatre, and so forth. What is commonly called collecting our minds mostly consists in a double effort of this sort, an effort to withdraw our thoughts from one class of ideas and to fasten them on another. Perhaps this appearance of attention to what is not an image, is illusory. But the question ought not to be ignored as it is by most psychologists. Dr. Ward's view of Attention as coextensive with the relation of the Subject to its presentations is barely referred to by Sully in a note. So far as the question is merely one of terminology it may perhaps be justifiable to dismiss it so. Dr. Ward's innovation in this respect seems to have little or no chance of general acceptance. But beneath the verbal question there lies a psychological question of far-reaching significance. The real problem is whether the Subject is essentially active in being conscious of an object. This is an instance in which Mr. Sully pays the penalty for his light-hearted dismissal of the "Assumption" of a psychological Subject. In consequence he is led to ignore a psychological problem of great importance.

Chap. vii. treats of the three processes of Differentiation, Assimilation, and Integration. This is an especially good piece of work. The distinctive part played in our mental life by each of these operations is well brought out, and their thorough-going interdependence is firmly grasped and clearly exhibited. It would, however, be a decided improvement to name the modes of consciousness correlated with these processes differently from the processes themselves. I should propose Discernment, Recognition, and Synthesis as appropriate terms. Mr. Sully rightly takes pains to distinguish between Discrimination and Differentiation. But he means by Discrimination definite Comparison, which is a much more specialised mode of consciousness than mere Discernment. The account of Assimilation is not altogether satisfactory. Two forms of this process are distinguished. The first is Automatic Assimilation, which consists in the "calling up by a present sensation of the trace or residuum of a past sensation (or sensations), which trace merges in or coalesces with the new sensation, being discernible only through the aspect of familiarity which it imparts to the sensation". The definition is certainly clear and precise. But it suggests two important questions which are not discussed by Mr. Sully. (1) In so far as the old sensation resembles the new, is the revival of its trace a distinct process from the coalescence of this trace with the new sensation, or ought we not rather to say that the emergence of the new sensation is identically the same process with the revival of the old? (2) Is exact repetition of an experience sufficient to produce recognition, or is the nascent excitation of differences distinguishing the past from the present an essential part of the process? These two questions are vitally connected with the problem of the nature and ground of suggestion by similarity. By Comparative Assimilation Mr. Sully means the conscious apprehension of a relation of likeness, which is rightly regarded as an explicit and definite form of the vague sense of similarity accompanying automatic assimilation. But this affinity between the two cognitions leads Mr. Sully to exaggerate the affinity between the corresponding mechanical processes. The process in the case of the definite apprehension of resemblance is rather one of integrative combination than of assimilation. The exposition of the conditions of retention and of the various processes of associative revival is very good. We must, however, take exception to the treatment accorded to the doctrine of psychical as distinguished from physiological Retention. This doctrine is not, as Mr. Sully implies, essentially connected with the conception of the mind as a distinct spiritual substance. The whole question may be treated as one of method. What actually takes place in the interval between production and reproduction is a problem which can only be solved in a complete system of Ontology. There are, however, two ways of symbolising what takes place: (1) in terms of material phenomena; (2) in terms of mental pro-

cess. It is contended that this last method possesses peculiar advantages, especially in enabling us to formulate the way in which persistent traces actively co-operate in determining the sequence of occurrences in consciousness, as well as the total mental state in each moment. This contention is ignored by Mr. Sully, as it is by other opponents of unconscious psychical processes.

We now come to pt. iii., which deals with the stages of intellectual development as products of the elaborative process discussed in pt. ii. Perception, Reproductive Imagination, Productive Imagination, Conception, Judgment and Reasoning are the leading heads into which the exposition is divided. The space-perception forms the most important topic included under the first head. The tactual perception of space is regarded as a product of two factors, *viz.*, muscular sensations proper and certain "discrete contact sensations which acquire spatial significance through association with movement". The essential importance of motor presentations as integral constituents of the space-perception is well brought out and defended against the theory of James, "that movement does not further the development of space-consciousness directly by contributing new psychical elements, but only indirectly by rendering more distinct the primitive local differences in the dermal (or retinal) sensations. On this point Sully agrees with Ward. But he rejects Ward's conception of a "local sign continuum". The contact sensations which acquire spatial significance through movement are according to him *discrete*, not continuous. He does not, however, urge any reasons in favour of this view, which seems to be in conflict with ordinary experience. When we lay our hand on an object, we cannot count the locally distinct tactual sensations received from it. It is even more obvious that this is impossible in the case of local differences in retinal sensation. Why then does Mr. Sully say that such local differences are discrete? The treatment of the various modes of tactual space-perception, such as the presentation of solidity and of the unity and plurality of objects, is luminous and satisfactory. The same praise can be extended to the account of the corresponding visual perceptions and of their connexion with the tactual. The interdependence of the perception of space and that of material reality is briefly referred to. It would be a great improvement if this point were fully worked out. It has not as yet received adequate treatment from any psychologist. The account of the presentation of material reality is good as far as it goes. But the subject ought perhaps to have been treated at greater length. The experience of resistance which is exclusively dwelt on is doubtless the most important point. But there are many contributory factors which should have been taken into account.

Ch. ix. deals with Reproductive Imagination. The distinction between percepts and images is carefully treated. Then comes

a detailed discussion of the Association of Ideas and of Suggestion by Similarity. Mr. Sully admits only one principle of Association, properly so called—that of Contiguity, and this he identifies with proximity in time. This scarcely coheres with the statement on p. 296 that “the process of association by the link of contiguity” may be regarded as “one of integration or totalisation” and “the last stage of the process that of reproduction or suggestion” as “a reconstitution of what was originally given as a whole by means of a recurrence of some of its parts only”. If this be true at all it must be the essential truth, and the mere external proximity in time must be accidental and secondary. The main defect of Mr. Sully’s general treatment of association is to be found in his failure to fully grasp and follow out to its consequences the conception of integration. He ordinarily speaks as if the only consequence of an association of *a* and *b* were a tendency on the part of *a* to call up *b*. But the full significance of the process can only be expressed by saying that *a* tends to call up *b* in the *same relation* to itself in which they were originally presented. This point is of essential importance for a true understanding of the higher processes of thought. In spite of this defect, the account of the various conditions which determine the working of the law of contiguity is on the whole excellent. The representation of Time is discussed in immediate connexion with contiguous association. We do not think that Mr. Sully has thrown much light on this obscure topic, though he seems to be working in the right direction in assuming a unique and irreducible experience of time-transience, which is transformed by a complex constructive process into a distinct representation of present, past, and future, such as exists for the developed consciousness. It is a serious omission that no reference is made to Ward’s view of intensity as the primitive element in our time-perception and of movements of attention as constituting temporal signs. This theory of temporal signs may fairly be regarded as the most interesting contribution to the subject since Herbart, and it ought not to have been ignored here.

Productive imagination is the subject of the next chapter. The general process of ideal construction, the distinction between its receptive and creative phases, the characteristic peculiarities of intellectual, practical and æsthetic imagination, and the stages in the development of imagination, are successively handled in a luminous and instructive way. The account of the constructive process seems to us defective in one point. It seems to be implied that the appropriate filling in of the scheme or “draft image” in which all mental production is rightly held to consist, merely depends on suggestion by contiguity and similarity together with voluntary selection and rejection of the material so supplied. It ought, I think, to have been added, that the scheme itself profoundly modifies the train of suggestion, so as to produce congruent presentations, independently of voluntary selection and



rejection. If we compare Mr. Sully's description with what we know concerning the creative activity of a man of genius, such as Mozart, its inadequacy and its consequent inaccuracy become evident.

The last two chapters of the first volume treat of the processes of Thought—Conception, Judgment, and Reasoning. In chapter xi., after an excellent account of the processes of Analysis and Comparison, the doctrine of General Ideas is taken up. Here the main point considered is the use of names as general signs. It is rather difficult to make out what Mr. Sully's views are in regard to the vexed questions connected with this subject. On the whole, however, he seems to think that the essential function of the general name is to "thrust prominently forward and so secure special attention to certain common class-features contained in a particular image". Now to me this is unintelligible, for the simple reason that in general thinking by means of words I do not for the most part fix my attention on any images at all, except the words themselves. The solution of this difficulty which would probably be given by Mr. Sully is indicated on p. 425, where we are told that "just as in algebraic processes the symbols  $x$ ,  $y$ , &c., though representing something, are used for the moment as if they themselves were the ideas they signify, so in much of our ordinary reasoning it is sufficient to attend to the relations of the names themselves, in order to carry out the process". We fail to follow this explanation. In algebraic processes, progress is possible because we proceed according to definite rules of operation. But what are the corresponding rules of operation in the case of language? Mr. Sully seems to imply that these are to be found in certain relations of the names themselves. What are these relations? They cannot be grammatical! On the whole we cannot regard this account of the part played by words in conceptual trains of thought as at all satisfactory. On the other hand, what is said about the part played by language in the first formation of concepts by the child is thoroughly good.

Chapter iv., which deals with Judgment and Reasoning, is perhaps somewhat superficial. There is, however, little in it that calls for adverse comment except what is said about belief. We are told that the term belief, in its intellectual aspect, "serves to mark off the objective attitude of ideation or of thought, or in other words the fact of its representativeness," and again that the "primal source of belief lies in the relation of representative ideation to actual presentation". Does this mean that thinking of what is not immediately present to consciousness is identical with believing? If this be so, how is it that the "reference of thought beyond itself" maybe equally present in belief, disbelief and doubt? Suppose that I am hungry and desire to satisfy my hunger. In this case there is obviously "representativeness" of ideation. I do not actually experience the satisfaction I desire. But it de-

depends on circumstances whether I believe that I shall ever get anything to eat. That is quite a different matter from the representativeness of my idea of food.

We now come to vol. ii., which is divided into two parts, dealing respectively with Feeling and Volition. On the whole this second volume is decidedly superior to the first, and this is very high praise. There is however less in it which calls for comment just because there is less in it which provokes adverse criticism. Feeling is identified with pleasure and pain in the widest possible sense which can be attached to these terms. It is sharply and clearly discriminated from everything of a presentative nature, including organic sensation. The chief point in which we are compelled to disagree with Mr. Sully concerns the relation of feeling to attention. He apparently holds that a pleasure or pain can be an immediate object of attention. If this were so, what would become of the distinction between feeling and presentation? We can fix attention on the idea of a feeling, but not on a feeling as it actually exists. The discussion of the sensuous and ideational, material and formal conditions of feeling is very good and full. After this follows an account of its varieties and development. Mr. Sully is careful to explain that, strictly speaking, there are "only two varieties of feeling, the pleasurable and the painful," and that what makes us distinguish between hunger, thirst, fear, &c., is "to some extent the dissimilarity in aspect of feeling-characters themselves (intensity, temporal course), and still more the difference in sensational or other presentative materials with which the feeling-element is incorporated". In chapter x. the nature and development of "Emotion" are treated. Mr. Sully regards "corporeal resonance" as an integral part of the emotion itself, but he is not "prepared with W. James to view it as the whole of the emotion". This question ought perhaps to have been discussed more fully. The next two chapters treat of specific modes of emotion in their order. First come the specialised instinctive emotions, such as fear and anger; then the concrete representative emotions, under which head exclusive reference is made to sympathy in its various forms and phases; and lastly, abstract representative emotions, including the logical and intellectual feelings, the æsthetic sentiment and the ethical or moral sentiment. Passing over much interesting matter, we select for comment the two last topics. Sully is at his best in the analysis of the conditions of æsthetic pleasure. He distinguishes carefully the sensuous, the formal, and the associational constituents of beauty. Stress is laid on the importance of association; "dim recallings of feeling-coloured experiences, individual and possibly also racial, constitute an important part in the rich emotive effect of beautiful things". The doctrine that beauty is "essentially formal in its nature" is set aside as untenable and obsolete. We are disposed to think that Mr. Sully hardly does justice to this side of the question. We may

grant the importance of the sensuous and the associational factors and yet continue to hold that the formal is essential. Form of combination, besides being itself pleasurable, may also immensely augment the pleasure-producing efficacy of the elements combined. This effect of form seems to be essential to properly æsthetic enjoyment. Take a case in which the associational factor is predominant. The beauty of an old romantic ruin may be largely constituted by the massive recall of a multitude of vague associations. But this peculiar mode of *massing* the associations, which seems essential to the æsthetic effect, may fairly be regarded as an æsthetic form.

Among the sources of the moral sentiment, Mr. Sully attaches primary importance to mere subjection to external authority. The peculiar sentiment of "oughtness" seems in "every case where it is distinctly recognisable to be developed by help of authority commands, and the correlative sanctions". His attempt to reconcile this view with the autonomy of the moral law on which Kant insists does not seem to us very successful.

In part v. the subject of "Conation or Volition" is taken up. "The most obvious general differentiating circumstance in all conative phenomena is, according to Mr. Sully, the presence of the psychical correlative of muscular action. Our consciousness of activity is based upon the common peculiarities of our muscular sensibility." This "active consciousness" is the essential concomitant of "voluntary process". But all the higher and more specialised forms of volition "involve not merely this psychical concomitant, but also a psychical antecedent in the way of consciousness of purpose or forecasting of end," for which the most comprehensive name is Desire. The relation of these two factors is somewhat vaguely treated. If desire is not a phase of "active consciousness," what is it? It is not feeling; though it is, according to Mr. Sully, always excited by feeling; but if it is neither feeling nor activity, it must be a fundamentally distinct mode of being conscious co-ordinate with these, and it ought to have been signalled as such from the outset. In order to remove this difficulty, it seems necessary either to entirely resolve that element in desire which distinguishes it from mere feeling and mere intellectual apprehension, into motor activity, or else to give up the attempt to exclusively identify "activity" with the "psychical correlative of the muscular consciousness".

The concrete development of will from the stage of primitive impulse to the pursuit of permanent ideals and higher forms of self-control is traced in a masterly and instructive manner. As against James it is rightly maintained that an ideo-motor action which takes place independently of desire must be regarded as non-voluntary. The higher phases of volition are analysed with care and accuracy, the explanation of the consciousness of freedom being especially good. We regret that space-limits forbid more detailed comment on this part of the subject.

The book is brought to a close by a chapter on "Concrete Mental Development," which deals in an interesting way with such topics as the unity of mental development, varieties of mind, scientific view of individuality, dreams, the hypnotic trance, and pathological psychoses, and various appendices mainly historical.

We congratulate Mr. Sully on having produced a sound, clear, and judicious work, which ought to prove of great value to students of Psychology.

EDITOR.

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*Les Altérations de la Personnalité.* Par A. BINET, Directeur adjoint du laboratoire de psychologie physiologique de la Sorbonne. Paris: F. Alcan, 1892. Pp. viii., 323.

No volume, I suppose, which has yet appeared in the International Scientific Series has dealt with a branch of science so entirely new as that which is embraced by M. Binet's book on Alterations of Personality. Setting aside a few well-known cases long quoted as isolated marvels, but now falling into line with ordinary experiment,—I doubt whether there is a reference in the whole treatise to any authority more than ten years old. And yet one would think that the theme must have come home closely enough to men's 'business and bosoms' to have forced itself upon their notice long ago. And there is indeed in many minds a feeling that if all that Janet, Binet, and others are now urging were really true, we should always have known it;—that if in reality one phase of personality could succeed another so easily in the same organism;—if several personalities could coexist in the same organism, and express themselves simultaneously by different channels;—we could not have seen metaphysical speculation, and medical practice, and active life going on so long with scarcely a suspicion that they were dealing with an entity so fractionable and even factitious;—liable, at any rate, whatever its underlying unity, to disintegrate superficially in so many bewildering ways.

In answer to such demurrers it can indeed be shown that the phenomena now insisted on have cropped up almost unheeded in all ages. It can even be shown that considerable masses of them have been put on record at various dates within this century, but have been passed by with that rash contempt which refuses to examine well-attested facts, simply because it distrusts their first suggested explanation.

Only within the last few years, however, has a systematic attack been made upon these problems,—from two quarters:—in England in papers by the late Edmund Gurney and others, published in *MIND* and in the *Proceedings* of the Society for Psychical Research; and in France by a few able members of the large group of *savants* now studying hypnotism;—the most persistent

experimenters in the matter being M. Pierre Janet and M. Binet himself.

M. Janet's important work, *L'Automatisme Psychologique*, was appreciatively reviewed by the late Editor of MIND in these columns in Jan., 1890. But neither that book, nor the English essays on similar topics, have as yet succeeded in securing the most satisfactory proof of acceptance,—namely, the repetition by other inquirers of the experiments therein described. The appearance of a handbook to this subject is therefore needful and opportune; and M. Binet's admirable lucidity of style, and his large personal share in the experiments described, point him out as an excellent author for such a treatise as the present.

'My intention,' he says in his preface, 'in writing this book, is not to prolong any discussion between rival schools. . . . I shall retain only the experiments which are repeated by all observers, and which always point to the same conclusion, whatever be the special object of the experiment. . . . We have before us a striking fact. A great number of observers, belonging neither to the same school nor to the same country, experimenting on different classes of subjects, with different ends in view, and often in ignorance of each other's work, are yet unconsciously arriving at the same result; and the result thus reached by various roads, and underlying a great number of mental phenomena, is a peculiar modification of the personality;—a duplication, or rather a fractionation, of the Self. It is discovered that in a great number of persons, and under very various conditions, the normal unity of the consciousness is broken; several distinct consciousnesses are produced, each one of which may have its own perceptions, its own memory, even its own moral character. It is the upshot of these recent researches on modifications of the personality which I here propose to describe.'

M. Binet's work is divided into three parts. The first part treats of *successive* personalities, in spontaneous or induced somnambulism; cases, that is to say (of which Férida X. furnishes the best known type), where two or more conditions follow one upon the other, but do not coexist in any readily perceptible manner. There is not, indeed (nor does M. Binet, I think, mean to assert that there is), any clear line of demarcation between these *alternating* personalities and the *coexisting* personalities which he discusses in his Second Part. Even in such cases as that of Ansel Bourne (which M. Binet does not quote), where the secondary personality seems to have been an absolutely transitory phase, it may be revived (as Prof. W. James showed) by hypnotism; and if that personality is in reality persisting below the surface, there is always the chance that appropriate artifices may bring it by moments to the surface even while the primary personality maintains its sway.

It is in this ingenious detection of *coexisting* personalities that M. Binet's own work has principally lain. Like M. Pierre Janet, he has found that the most convenient conditions for splitting up the personality into several fractions are afforded by hysteria;—which is in fact the vague and unsatisfactory name which we are

forced to give to a whole group of disintegrations below the level of ordinary consciousness,—a disease, as I have elsewhere termed it, of the hypnotic self. It is curious to note the change which these last few years have seen in the way in which hysteria is regarded. A generation since, it was enough to call any phenomenon 'hysterical' to imply that it was a nonsensical fraudulent thing, *ipso facto* beyond the scope of an honest man's inquiry. Now the hysteric, by a turn of the wheel, is exalted into a kind of arbiter of psychical fashions,—outside of whose realm, as some authors would have us believe,—every phenomenon is in some way dubious or abortive,—*fruste*, or *mixte*, or *suspect* or *larvé*. This exaggerated cult of the hysteric must soon pass away; and the solid advantage will remain that *savants* have discovered that they are needlessly timorous if they leave a human phenomenon unexplored for fear lest the human creature concerned may trick them. Let them take their chance of a few mystifications at the outset; in the long run steady scientific inquiry must cancel these isolated frauds and come by wide comparison to a safe result.

It is characteristic of hysteria to produce contractions, paralyses, anæsthesiæ, which, though real enough in themselves, result from no organic lesion, no absolute destruction of faculty, but rather from the withdrawal of certain powers of nervous co-ordination from the dominion of the ordinary self; those powers remaining, as is now found, evocable by artifices of several kinds;—though evocable no longer as factors in the main personality, but as forming nascent personalities of their own. Thus the hysterically anæsthetic arm can be made to write, and what it writes will be unknown to the primary personality, and may include (for instance) facts which the primary personality is vainly endeavouring to remember (p. 176).

Particularly curious are the experiments illustrating *unconscious sight*; the persistence, throughout hysterical amblyopia, of a subliminal recognition of objects as complete as before.

'Close the better-seeing eye of a hysteric,' says M. Binet, p. 120, 'and place before the worse-seeing eye a series of words in diminishing type, some of which the worse eye cannot read at that distance. Then place a pencil in the subject's hand; and the pencil will often write, without the subject's knowledge, certain of the words thus found illegible. The employment of automatic writing thus shows that the subject [although looking through the worse eye alone] does continue to perceive the letters. All that the opening of the better eye effects is to make that perception a conscious one.'

M. Bernheim, in an article to which M. Binet hardly does justice (*Revue de l'Hypnotisme*, Sept., 1886, p. 68), had already ingeniously shown that the amblyopia and the achromatopsia of hysteria and of the hypnotic trance are of purely psychical origin. French observations upon personality have mainly been made upon the hysterical subjects whom their great hospitals provide for the *savant* in enviable profusion. But it is fair to M. Binet to point

out that he has avoided a premature assumption from which M. Janet's work is not free,—namely, that the very existence of any of these automatisms, or dissociations of personality, is in itself an indication of hysteria. On the contrary, he says (p. 197), that 'it has now become a commonplace (*il est aujourd'hui devenu banal*) to remark that most of the experiments made upon hysterical patients can be repeated with results nearly equivalent, though diminished, upon healthy subjects; and that consequently hysteria, whose intellectual disturbances have been studied with special predilection by contemporary French psychology, should be considered as a reagent rendering more conspicuous certain delicate phenomena which are found also in normal life'. To those Englishmen who have long contended for this wider conception of automatism it is gratifying to find that what was a year or two ago condemned as a paradox has by this time become a truism instead.

And there are signs, too, that M. Binet—in a greater degree, perhaps, than any French writer who has preceded him—is becoming aware of the delicacy of perception, the complexity of intelligence, which we must needs attribute to the subliminal consciousness. This is first brought out (pp. 125, 191) by the singular tactile hyperæsthesia often existing in those surfaces of a hysteric which are anæsthetic for her primary self; so that M. Binet believes that he has calculated 'that the unconscious sensibility of a hysterical subject is at certain moments fifty times more delicate than that of a normal person'. Still more markedly do these subliminal powers come out in the 'modifications of personality induced by suggestion' which form the subject of the Third Part of M. Binet's book. This division, although convenient, is not quite logical; since the automatic writing, for instance, with which this Third Part is largely concerned, is perhaps as often a spontaneous as a suggested phenomenon. The problem as to the degree and the source of the intelligence shown in automatic script is, perhaps, of all those laid before us the most complex and important; and it is the more needful for me to touch on it here inasmuch as both M. Binet (p. 299) and M. Janet ('*Le Spiritisme Contemporain*,' *Revue Philosophique*, April, 1892, p. 419), while mentioning me by name as having explained the great bulk of automatic writings as originating within the writer himself, and involving nothing more than a dreamlike rearrangement of facts already known, have omitted to state that I have published in the *Proceedings* of the S. P. R. a number of automatic messages, oral and written, which do in my view provably contain information not acquired by the automatist in any normal manner; but acquired at any rate by telepathic transmission from other living minds, if not by penetration into or commerce with some source still more unexpected or remote. Thus much it seems needful to say; but I do not mean that it was incumbent upon M. Binet to discuss at length even so fundamental a question as this. He is avowedly



dealing with those matters only on which the consensus of experts is already tolerably complete; nor can any one look for finality in the first handbook of a fresh branch of science, or suppose that ten years' work can bring us within sight of the terminus of any new-found pathway into the unknown.

The conclusions to which all the experiments taken together do plainly point are already weighty; weighty enough, as formulated in M. Binet's closing words, to prompt both physiologist and psychologist to something more of energy than they have yet shown in the collection and analysis of these obscure messages from the unsuspected depths of our being.

'It remains,' he says, 'to indicate the most important conclusion to be drawn from these studies. That conclusion concerns the limits of consciousness. Until now it has commonly been assumed, that consciousness indicates its own limits, and that where it seems to end nothing is left save physiological processes. Thus the nervous activity of each of us would consist of two kinds:—the one luminous, aware of itself; the other blind, unconscious, and confined to material changes, fulfilling themselves in the cells and fibres of which the nervous centres are composed. Upon this basis many hypotheses have been built;—among them the hypothesis of unconscious cerebration. 'But this hypothesis rests only on the testimony of our consciousness; and that testimony should be regarded as subject to grave suspicion. We have pointed out that forgetfulness is often a purely relative thing,—true only of one particular mental condition, and not of another. We have seen that unconsciousness may exist only in regard to one phase of personality, and may disappear for another synthesis of personal elements. In a word, there may exist, in the same individual, a plurality of memories, a plurality of consciousnesses, a plurality of personalities; and each of these memories, of these consciousnesses, of these personalities, is aware only of that which passes within its own special realm. Outside of our habitual consciousness, there may exist within us conscious thoughts of which we know nothing. At present it seems impossible to determine the nature, the importance, the extent of these consciousnesses. It may be that consciousness is the privilege of certain special psychical acts alone. It may be that it extends through every part of our organism. It may be that it accompanies every manifestation of life itself.'

Significant as such speculations as these may be, they stand by their very nature at the first threshold of the new inquiry. The communications or messages between different phases of personality—different strata of the self—to which this remarkable book has introduced us, have corresponded as yet to the trivial phrases by which operators at the two ends of a cable assure themselves that the electric current is duly transmitted. Communication once established, news will follow; and those who know most of the messages even thus far received will be the slowest to set anticipatory limits to the area from whence that news may be drawn, or to its eventual import to men.

FREDERIC W. H. MYERS.

*La Caractère de l'enfant à l'homme.* Par BERNARD PEREZ.  
(Bibliothèque de philosophie contemporaine.) Paris: Alcan,  
1892. Pp. iv., 308.

M. Perez points out in his preface that this is the first attempt at an Ethology published in France, and although ill-health has prevented the author from producing a work in harmony with his own ideal of perfection, yet "such as it is," he modestly says, "it will perhaps be useful in indicating the path to be followed—or shunned—by those who come after me, and who have more talent and leisure and strength to complete their work". The work will be welcomed by psychologists, not only for the fine observations which it contains, but also for the reason which the author draws attention to: that it enters a fresh field of investigation. For in this work M. Perez breaks new ground, or at least ground which has for a long time been allowed to lie fallow. By earlier writers, both medical and psychological, the differences of individual character were investigated and reduced to one or other, or to a combination, of the four temperaments. This classification, due to Hippocrates and Galen, lingered long after the weakness of its physical basis was seen by those who used it. The terms Sanguine, Choleric, Melancholic, and Phlegmatic served well enough to describe certain striking differences of individual character; and although blood and bile and phlegm might have nothing to do with them, the physiologist was, and indeed still continues, unable to substitute for the old hypothesis a satisfactory account of the organic conditions which determine those marked divergences of character. Till recently psychologists do not seem to have made an attempt to do so after a psychological manner. Another circumstance caused the doctrine of individual temperaments to be neglected. From the time of Locke—or even of Hobbes—in England, and from the time of Condillac in France, empirical psychology laid stress on the initial similarity of all individual minds. To begin with, individual minds were only individual nonentities, and their similarity only the identity of zero with zero. From without—through experience and education—came all the circumstances which made one man differ from another. There were no inherited differences characteristic of the individual, which it was difficult for education to modify. The doctrine of temperaments was accordingly discarded, or, if anything was left of it, it could only be that different surroundings and training left different results upon the individual. But only a foregone conclusion could lead to the view that these differences were entirely due to circumstances and not inherited—innate in character. And it is natural that psychologists should now return to the investigation of their nature and causes.

Lotze and Wundt, amongst recent psychologists, have already done so; and both have made use of the old fourfold classifica-

tion of temperaments: although, for Lotze, this is little more than the framework on which his fine observations are hung, and he supplements it by a careful analysis of the mental conditions from which such differences of character arise.

M. Perez has no doubt judged wisely in disregarding a classification which is without scientific basis. His book is "a modest contribution to the psychology of characters"; and character "is not an amalgam of elements differing in number and degree," but rather "an equilibrium, more or less unstable, of forces which exist at least virtually in a given organisation. As in mechanics, we seem able to indicate, at least approximately, the direction and therefore the intensity of the more important of these forces" (p. 3). Character, or moral personality, is, says M. Perez (p. 22), expressed in movement; and accordingly "a minute study and rigorous classification of the different forms or combinations of movements would represent an exact scheme of all the possible modifications of character". From these certain general modes may be selected, and therefore "neglecting all the other qualities and general forms of movement," he singles out three: quickness, slowness, and intensity ("*l'énergie intense, ou l'ardeur*"). As quickness and slowness are simply different degrees of rapidity, the author appears to me to be incorrect in holding that his division has "nothing in common" with Wundt's, which is based on "the twofold opposition: one relating to the strength, the other to the rapidity of change in mental movements" (*Physiologische Psychologie*, ii. 422).

At the same time the author's classification seems intended to have a more general application, and is not like Wundt's in the interests of the old fourfold division. Indeed, M. Perez avoids a fourfold classification by keeping distinct the two opposed degrees of rapidity—quickness and slowness—and by refraining from distinguishing Intensity into the two degrees, opposed in a corresponding way, of strength or weakness. To his three elementary modes he adds two others by combining intensity first with quickness and then slowness; and to these he adds another mode in which the three elements are in equilibrium. Thus six types of character result: Quick, Slow, Intense, Quick-Intense, Slow-Intense, and Balanced.

One objection to this classification M. Perez notices. The different mental movements of an individual may be distinguished by very different degrees of rapidity or of intensity. Thus some minds classed as slow may be quick in some respects—in perception or in imagination or in decision; other minds classed as quick may yet be slow of speech or of sluggish imagination; and so on. The objection is by no means fatal. For the classification is a classification of types, and is not rendered invalid by the variation of individuals from the type: though it is important to ascertain the amount of this variation.

It is of more consequence to notice that the classification pro-

ceeds upon the assumption that the fundamental distinctions of character are merely quantitative: they are simply variations in the rapidity and in the force of movements. How, then, is even the direction of the movements to be explained? It is clear, as M. Perez of course admits, that the origin of pride, anger, benevolence, &c., cannot be deduced from any combination of rapidity and intensity of movements. But the question is: Do these latter distinctions account for one man having a predominant tendency to pride, another to humility, for one man showing benevolence when another feels only for himself? Such feelings are indeed said to be "modified in important ways" (p. 24) by the elements of difference admitted by M. Perez as fundamental in character. But he does not assert that these differences are sufficient to account for one man being proud, another humble, &c.: although a good many passages in his work point in this direction; and the assertion would be necessary to establish the sufficiency of his principle of classification.

After the short chapter which explains his classification of characters, M. Perez proceeds to discuss in detail each of his six types: and the six chapters devoted to this purpose are the most striking portion of his work. To the study of each type are added two illustrative portraits, drawn from life, in which the characters of two persons belonging to the class are analysed and their development traced.

The quick or lively are, he says, distinguished by rapid movements—in walking, prehension, and repulsion, in the tension of the features and other modes of expression, including writing and speaking. Rapidity may be united with force or feebleness, but great mobility limits the force and duration of movements; sensibility is weakened by dispersion; and the quick tend to be vain, presumptuous and affected, and, in general, superficial. It is important to remember, however, the different conditions which may lead to this rapidity of apparent movement. It may be due—perhaps is generally due—to want of deliberation; but a similar degree of rapidity may be the result when the power of reflexion is keen and quick: so that the same apparent result, as measured by rapidity, may be due either to a very slightly developed or to a very highly developed intelligence.

In this, and still more in some of the subsequent studies, it is difficult to see whether all the traits of character ascribed to a type are regarded as really deducible from the typical characteristic or whether some of them are only to be regarded as having been found coexisting with it in the typical individuals whose portraits illustrate the studies.

As rapidity and intensity are regarded as limiting one another, it is natural to look upon the Quick-intense as a transitional type between the quick and the intense. In this type the mobility of impression and emotion combined with tendency to persistence leads to a sort of recurrence and rumination of ideas, images,

sentiments and volitions. They are said to be more successful in ethical and logical construction than in æsthetic and literary, and yet to be seldom absolutely practical. They may have good sense, but are commonly inconsistent and only half serious; like the quick, they are imitative, but their imitation is deeper; they are credulous and even superstitious, especially if timorous by nature; their education and environment seldom leave them more than a "relative freedom," but it is difficult for them "to be truly dissembling, for to lie well there is needed much passion, energy, or wit in addition" (p. 59); and yet they have a "good facility for lying" (p. 57). Their voluntary characteristics are a composite, in varying proportions, of decision, inconstancy and persistence.

The Intense are described as showing commonly strong sensibility and powerful intelligence, but always with a certain tendency to confine their scientific interests within the sphere of personal inclinations (p. 88). They are born for action (p. 90). Egoism dominates their character. They are imperious even in their affections. Beneficence, honesty, modesty, are but the mask which covers an irritable and revengeful character (p. 86). "It is not that they always put their ego far above that of others, but this ego is impatient of all that crosses its path" (p. 87).

It is not necessary perhaps to follow in detail M. Perez's analyses of the Slow, Slow-intense, and Balanced types of character. Enough has been said to show the very great interest of the line of investigation upon which he has entered. The interest which comes from his method of working, illustrated as it is by the analyses of actual characters, can only be referred to here.

The remaining chapters of M. Perez's book deal with the reciprocal relations between various leading traits of character, emotional, volitional and intellectual. It is hardly necessary to say that they are distinguished by the author's well-known power of delicate psychological observation. But it is the earlier portion of the work which is of chief importance from the original and suggestive contribution which it makes to the study of different types of character.

W. R. SORLEY.

## VII.—NEW BOOKS.

*By Various Hands.*

*Essays on Literature and Philosophy.* By Professor CAIRD. Glasgow: Maclehose, 1892. 2 Vols. Pp. 553.

These volumes contain three essays which fall strictly within the range of philosophy, and five essays upon the genius and work of Dante, Goethe, Rousseau, Wordsworth, and Carlyle. Any criticism of the last-named essays would here be out of place, and it may be sufficient to say that they ought to be read by all philosophical students of literature. Of the metaphysical essays, that on Cartesianism is an admirable example of philosophical exegesis. It deals first with Descartes himself, exhibiting with prominent emphasis how much his system is wrapped up in his Idea of God, and how important is the function which this Idea has to discharge in his effort to unify what he had too widely put asunder. The peculiar development of Cartesianism in the hands of Malebranche is sketched next, with its tendency to Asceticism and Mysticism: and then follows a singularly clear exposition of the development given to it by Spinoza. The title is, of course, too comprehensive for the extent of ground covered, and as the article was published in 1876, it might have been enlarged to cover the other offshoots from the Cartesian stock, or been kept in hand until this was done. A similar estimate of Leibnitz and of Locke in relation to Descartes would at any time be welcome from Professor Caird.

The essay on Metaphysics is hardly what would be expected from an article in an Encyclopædia, were it not that the editions of the *Encyclopædia Britannica* have accustomed us to *ex parte* deliverances in place of comprehensive summaries. It is quite dogmatic, and makes no pretension of being anything else. The thinkers on whose side the writer stands are set in high places, while others are brought up only to be summarily condemned: there is neither general history nor conspectus of the situation at the time of the issue of the article. What we have, however, is of first-rate quality, and of great practical value as a masterly display of the metaphysical views of a leading thinker of to-day: a clear, well-arranged and massively-expressed exposition in brief of a definite philosophy. It is superfluous here to enter into detail. Professor Caird's position is well known. In the essay he states the general problem of metaphysics as set by Aristotle, and divides the subject into four branches: its relation to Science, to Psychology, to Logic, and to Theology. Professor Caird explicitly places himself as a disciple of three great masters—Aristotle, Kant, and Hegel; he states the views of each with critical elaboration of the fundamentals; he shows the deficiency of the earlier master, and its emendation by the later, and the deficiency still left when all three had passed, and thus himself indicates that he considers that his metaphysics not only sums up, but goes beyond them all. A mind which has assimilated the achievements of these cardinal thinkers must itself be strong in its capacities, and the assimilation has issued, as is well known and here is plainly exhibited, in great intellectual vigour and penetrating insight. Expressed as it is in free use of technical terms, and still more, of technical notions, the essay is not an introduc-

tion to the subject, and indeed would be unintelligible to any but somewhat advanced students ; but for such it is admirable, and cannot fail to make a permanent impression on readers, whether sympathising or antagonistic. The omission of all reference to Lotze, especially in several places where he seems almost suggested, and the approach to an encumbering with detail in the treatment of Kant, are signs that the essay as it stood in 1883 might with advantage have been recast a little in 1892. The close of the essay is somewhat tame, considering the opportunity for indicating what Professor Caird from his high standpoint would consider the present situation of philosophy and its immediate prospects. But as a matter of fact this is done in an essay in the first volume—*The Problem of Philosophy at the Present Time*. In this Professor Caird, in a somewhat more popular way, indicates the increasing difficulties which our advance in knowledge of man and of nature places in the way of universal synthesis. In this, as in all the essays, Professor Caird has deeply at heart the function of religion, and especially of Christianity, in its relation to philosophical speculation ; and he ends in ascribing to philosophy a vindication of the religious consciousness, and to Christianity the illumination of 'the idea of the unity of man as spiritual with an absolute Spirit'. He recognises with his three great leaders at once the finitude of man's rational capacity, and his power of rising above it by his very consciousness of limitation.

*The Spirit of Modern Philosophy.* An essay in the form of lectures. By JOSIAH ROYCE, Ph.D., Assistant Professor of Philosophy in Harvard University. Boston and New York : Houghton, Mifflin & Co., 1892. Pp. xv., 506.

This work is the outcome of a course of popular lectures in which the author undertook to exhibit, apart from technicalities, the development of modern speculation in relation to the fundamental problems of life. He has accomplished a somewhat difficult task in an admirable manner, and has given us a most lucid and brilliant account of certain aspects of modern philosophy, though of course without any attempt at completeness or minuteness of detail.

The book is divided into two parts: the first consisting of the historical review, while in the second the author makes his own "Suggestions of Doctrine," indicating the views to which he has been led by a study of the history of philosophy. Dr. Royce recognises two stages in the pre-Kantian philosophy: the first, a period of Naturalism pure and simple; the second, a kind of new Humanism, for which the inner world of man's soul is the centre of interest. The traditional beginning of modern philosophy with the "Cogito ergo sum" of Descartes is discarded, as likely to produce a false impression of subjectivity in the first period. Accordingly a start is made with Spinoza, the religious aspect of whose philosophy is well brought out. Under the title, "The Rediscovery of the Inner Life," we have a rapid survey of the English development from Locke to Hume, leading up to Kant as the initiation of the third period of modern philosophy. Dr. Royce himself signalises his neglect of Leibnitz as the most serious error of omission in his book, and it is to be regretted that he felt compelled by his limitations of space to pass over this thinker, both on account of the influence of the Leibnitz-Wolffian Dogmatism upon Kant, and of his importance as the representative of a tendency in speculation which hardly receives adequate recognition from our author. The lecture upon Kant is that



which appears to me to be the least satisfactory in the series. The standpoint throughout is that of Kant's idealistic successors rather than that of the critical philosopher of Königsberg, a mode of treatment which has done more than anything else to obscure the true significance of his work. It is indeed admitted (Appendix B) that a thoroughly consistent interpretation cannot be made from this point of view; but "the undeveloped Kant" whom Dr. Royce recognises is a Kant who regards the forms and categories as so many instruments with which I start equipped and which I apply to the data of sense merely because "it is my nature to". The historical Kant, however, once for all accepted Experience as a fact, and sought to determine its most general conditions and to show the necessary implications of these in the whole. He attempted neither to deduce it from idealistic presuppositions nor to explain it by means of subjective faculties. The statement of the second Antinomy (p. 123) is somewhat misleading. It was not concerning Space and Time themselves, but concerning the world in Space and Time, that Kant found such perplexing and suggestive difficulties. The account of the post-Kantian development, from Fichte to Hegel and Schopenhauer, is altogether admirable, and may safely be recommended as the best that has yet been given to English readers. Especially happy is the treatment of Hegel, in which the origin of the dialectical movement in what Dr. Royce terms "the logic of passion" is brought out. In the concluding chapter of the first section the connexion of the historical method and of the historical conception of evolution with the romantic movement in literature is shown.

Of the "Suggestions of Doctrine," in which our author attempts to make his own synthesis, only a brief indication can be given, though they would well repay careful consideration. A careful statement is given of the case for what is commonly known as Absolute Idealism, but Dr. Royce evidently regards as of greatest novelty the argument developed in chapter xii. The distinction is first drawn between the *describable* and the merely *appreciable* and incommunicable. The world of description, with its abstract and universal forms and categories, is the real world of physical science. This is then shown to be an inadequate view of reality. We can only describe what has first been appreciated. Moreover, the objectivity which we must attribute to other selves and to their appreciations, though no place can be found for these in the world of description, implies the existence of real spiritual relations between us or that we share in the organic life of the One True Self. The world of appreciation is therefore deeper than the world of description, and we have here a reconciliation of physical law and moral freedom. In the concluding chapter on "Optimism, Pessimism, and the Moral Order," the easy optimism which ignores or denies the existence of evil is severely condemned; its antagonism to morality and its connexion with pessimism are also exhibited. Dr. Royce seeks to reconcile the reality of evil in the finite individual with the supremacy of the moral order by means of the view that the holiness of the Infinite Self consists just in condemning and triumphing over this evil of the individual, as human virtue consists not in the absence but in the conquering of evil impulses. There are many problems connected with the questions which Dr. Royce discusses, such as that of the relation of the finite to the infinite Self, which, as he is well aware, are far from being solved; but his contribution to their solution cannot be denied to possess the claim which he makes for it, namely, that of suggestiveness.

*The Grammar of Science.* By KARL PEARSON, M.A., Sir Thomas Gresham's Professor of Geometry. London: Walter Scott, 1892. Pp. xvi, 493.

The following brief summary of Prof. Pearson's teaching will fitly introduce our critical comments. There is no legitimate field of inquiry that is not subject to the scientific method, *viz.*, the classification of facts and the establishment of formulæ describing the relations between these facts; or "the expression in conceptual formulæ of the routine of sense-impressions". The possibility of such formulation probably depends on the *selective* nature of the perceptive faculty. In the routine of sense-impressions there is no inherent necessity; the only necessity we know is in the sphere of conceptions. Proof in the field of perceptions is only overwhelming probability. As for perceptual Space and Time, *each* is defined to be the mode by which we distinguish sense-impressions having the same position as regards the other. Such *concepts* as geometrical surface, atom, and ether are only valid as shorthand methods of describing the correlation and sequence of phenomena. Motion, as a mixed mode of perception, can be conceptually analysed by Geometry. The *Matter* that is said to *move* can only be conceived as a geometrical ideal, and the laws of motion thus constitute a conceptual model enabling us most accurately to describe the sequences of our sense-impressions.

It is not easy to characterise the author's philosophical standpoint. The word "sense-impress" figures largely throughout the exposition. But we cannot gather what sort of entity this sense-impress may be. Of course we have in the first place to understand it to be an object having relation only to an individual subject, *viz.*, to the 'I' that am conscious. But the reader suddenly finds himself carried away from this simple solipsistic sensationalism to the regions of physiology. In the nervous system these sense-impressions may exist without consciousness: and the consciousness which is my only immediate certainty is found to be conditioned on brain-processes which exist for me only as "constructs". The sense-impression has, therefore, somehow to be conceived in terms of matter and motion, as a physiological material reality. But this is not the only ambiguity. Prof. Pearson suggests that the human perceptive faculty is a great sorting-machine, which chooses some and rejects others of the sensations which flow into it. Such language obliges us to conclude that the realities amongst which the scientist really feels at home are not after all the psychological presentations of the individual consciousness, but entities objectified into independence of any and all individual subjects. The fact is that Prof. Pearson, the Scientific Reformer, is not in harmony with Prof. Pearson, the Philosophic Nihilist. His account of the Laws of Motion contains many useful and suggestive improvements on the older statements of Physicists. But the clearness with which these are conceived depends on an entire reversal of the Sensationalism of Prof. Pearson's philosophic standpoint. We should have wished that the author, instead of vehemently assailing the "Metaphysicians," had developed a more penetrating and independent analysis of scientific conceptions, inferences, and methods. From the chapter on Space and Time we can learn nothing about these entities but what might be equally well applied to the general qualitative discriminations of sense. Neither do we understand why phenomenal reality is denied to Space and Time, unless it is to be understood as *affirmed* of something else. Yet it is not *Matter* of which phenomenal reality is affirmed: and the only help we get is the dictum (p. 50): "The reality of a thing depends upon the possibility of

its occurring as a group of immediate sense-impressions". Neither does the distinction between conception and perception throw any light on the question. On p. 115, in speaking of the *atom*, Prof. Pearson writes: "It may pass from the ideal stage to the real; but till it does so, it remains merely a conceptual basis for classifying sense-impressions, it is not an actuality". We should suppose from this passage that a concept is a *problematic sense-impression*, and yet it seems impossible to understand how a *problematic* sense-impression has any better title than an *actual* sense-impression to serve "as a basis for classifying sense-impressions". Of course, Prof. Pearson throughout follows the example of his school, and unconsciously treats the "sense-impression" as the thing-in-itself, having a being independent of any relation to aught else. This is most clearly brought out in his Chapter on Life, where he states the problem to be: "What groups of sense-impressions do we classify as living, what groups as lifeless?" (p. 400). He thus glides with serene unconsciousness into a purely realistic—if not materialistic—mode of speech. We have some confidence that Prof. Pearson is capable of writing a more coherent and profound treatise on the Logic of Science than this crudely conceived and hastily elaborated volume.

The Hibbert Lectures, 1891. *Lectures on the Origin and Growth of the Conception of God as Illustrated by Anthropology and History.* By Count GOBLET D'ALVIELLA, Professor of the History of Religions in the University of Brussels. Williams & Norgate, 1892. Pp. xxi., 296.

The author regards this work as a continuation of his previous studies on "The Contemporary Evolution of Religious Thought in England, America, and India". He now investigates the gradual development of the forms of Religion there described, and their relation to the lowest manifestations of religious culture. Lecture i. is on the Methods of Research into the pre-historic manifestations of religion, and is a vindication of the Comparative Method of ascertaining Origins. Pre-historic archaeology and folk-lore would give a meagre harvest of knowledge in regard to primitive beliefs, if we could not avail ourselves of comparative ethnography to supply explanatory ideas and hypotheses. These three sources of information may, however, yield identical suggestions, and then the method requires that the supposed primitive beliefs shall be shown to be connected without breach of continuity with the religious ideas and institutions of our own time. In lecture ii., on the "Genesis of the Idea of God," are discussed those psychical characteristics of primitive man out of which springs worship of nature and of the dead: the impulse to personify physical objects, the fear of things whose agency cannot be understood or controlled, the helplessness of the primitive mind to grapple with the problem of reaching causes by elimination, and the puzzle of a roving dream-consciousness side by side with the stillness of sleep.

From such beginnings sprang spiritism, fetishism, and idolatry. Personified objects allow their spiritual essences to quit them, and become independent powers; independent spirits may again incorporate themselves in an object, the fetish, and the fetish may be fashioned so as to reproduce the appearance of the spirit resident therein, and so become the idol. Lectures ii. to v. describe such a commencement and a continuation of development through graded conceptions determined by the known lines of intellectual and social evolution.

Differentiation of character among superhuman powers, grouping in

hierarchies, abandonment of Divine caprice, moralisation of Divine purpose, and, finally, unification of the Divine personality, become successively the tendencies of human thought, and are now successively accounted for by science. Finally, the author attempts to forecast the future of religious worship.

References are made to a wide and catholic collection of authorities.

*The Philosophy of Locke in extracts from the Essay concerning Human Understanding.* Arranged, with introductory notes, by JOHN E. RUSSELL, A.M., Mark Hopkins Professor of Philosophy in Williams College, New York: Henry Holt & Co., 1891. Pp. iv., 160.

The first to appear of a "Series of Modern Philosophers," edited by Prof. E. Hershey Sneath, of Yale University, the prime object of which is to meet the needs of students who have not time to read the complete works in which the leading philosophical systems are expounded. For this purpose the mere text-book with its brief *résumé* and exposition, itself an *interpretation*, of the various systems is insufficient. It is best for the student to come into *direct contact with the text of the author* studied, and to "make his own interpretation," thus from the outset doing first-hand work and his own thinking, and obtaining real training and knowledge. This series meets this practical difficulty, and at the same time accomplishes the desired end of bringing the student face to face with the original authors, by presenting "the substance of the representative systems of modern philosophy in selections from the original works," each volume containing in addition to the "selections" a short biographical sketch of the author, a brief exposition of his system and statement of its historical position, a bibliography, and (in Locke, and it is to be hoped in all the rest also) an index. Eight volumes, including Locke, are arranged for: Descartes, Spinoza, Berkeley, Hume, Reid, Kant, and Hegel. If these are successful, others "will probably follow". Prof. Watson's *Extracts from the Philosophy of Kant*, which appeared independently in 1888, and was noticed in *MIND*, xiii. 449, has been included in the series, which it may have suggested, an edition having been purchased for this purpose. With regard to Locke in the series it is sufficient to state that the selections seem to be judiciously made, and the attempt thus to give the substance of Locke's philosophy in his own words, so far as contained in the *Essay on Human Understanding*, successful. Prof. Russell, in his estimate of Locke's historical position, regards Kant in his critical philosophy as the legitimate successor of Locke, rather than Hume and the materialism of the French school.

It may be added that Prof. Sneath is also editing a similar series in Ethics to be published by Ginn & Co., Boston, Mass., U.S.A., and that arrangements have been made for the following volumes: Hobbes, Clarke, Locke, Butler, Hume, Price.

*Psychologie du Peintre.* Par LUCIEN ARRÉAT. Paris: F. Alcan, 1892. Pp. 320.

M. Arréat seems to think that the soul of art can be best approached through the soul of the artist. The texture of the fabric depends on the structure of the room. M. Arréat therefore enters into an elaborate description of the mental, moral, and physical idiosyncrasies of the workers in pictorial art. His book is divided into five parts: (i.) treats of the physiological habitudes acquired or inherited by those who devote themselves to the study of art—cerebral development, tempera-

ment, nervous susceptibility, and visual discrimination. These topics are treated in a genial gossiping manner with an abundance of biographical illustration vividly depicting the most salient characteristics of renowned artists. We are not surprised to find that artistic talent is hereditary, and that in a vast number of instances cited by our author the progenitors of a great painter have shown more or less aptitude in aesthetic construction. Part ii., entitled "La Vocation," deals with the special psychic conditions most favourable to the development of artistic excellence. Of these memory or representative imagination is the most necessary factor, and in the power of reproducing perceived impressions M. Arréat finds two elements: "the motor element and the visual element" (p. 55). In this connexion our author has some pertinent remarks on the distinction between the play of normal and that of hallucinative imagination. He thinks that they shade insensibly into each other, and that an exaggerated power of mental vision has often ended in insanity.

Parts iii. and iv., pursuing the same line of discussion, broaden out into a more general consideration of the mental and moral traits of the artist and the influences of his environment—religious, social, national, domestic.

Part v. notices the weaknesses to which artists are especially liable, their tendency to melancholia, seeking relief in intemperance, and culminating in suicide. In conclusion, our author seems inclined to identify artistic genius with sympathetic power. The greatest genius is he who can touch most profoundly the springs of human emotion.

*Condillac et la Psychologie Anglaise Contemporaine.* Par LÉON DEWAULE, Principal du Collège d'Arras, Docteur és Lettres. Paris: F. Alcan, Editeur, 1892. Pp. 331.

In this treatise the author endeavours to exhibit modern evolutionist theories of psycho-genesis as having been developed from Condillac's doctrine, ascribing all mental products to a sensory origin.

The work is divided into *two* main portions, the one treating of the evolution of the individual consciousness so far as it consists of transformed sensations (le transformisme psychologique), the other of the evolution of communities, or the application made by Condillac of his principles to history and social science.

In part i. the following six topics are handled in as many sections: (1) The Germ, *i.e.*, Sensation. (2) The Evolution of the Understanding. (3) The Principle of Association in Mental Evolution. (4) Association and Evolution in Logical Operations. (5) The Evolution of the Active Powers and the Will. (6) Psychology of the Lower Animals.

M. Dewaule affiliates what he regards as the contemporary school of English psychologists to Condillac through the principle of the Association of Ideas, which, as M. Dewaule affirms, Condillac was the first to lay down as the mainspring of psychic process.

Of course, a Frenchman's estimate of a Frenchman is likely to be tinged with some national bias, and the reader of this work must, therefore, be prepared to find the influence of Condillac given a somewhat wide range. Did not Condillac, asks M. Dewaule, draw attention to one of the chief problems of the modern psycho-physical schools, *viz.*, the perception of extension through local signs? Originally, writes Condillac (*Traité des Sensations*), "the statue was not conscious of any local distinctions in its own body. It seemed to itself to exist only at one point; in other words, it had no power of local discrimination. To

discover the place a pain occupied on its body it would be necessary to touch it with the hand." Here, then, says M. Dewaule, we have the idea of the well-known experiment with the compasses over different parts of the skin (p. 21). It is alleged that Condillac anticipated Spencer in tracing the faculty of memory to the subjective distinction between faint and vivid states of consciousness. Condillac also, it is urged, showed in almost the same terms as Spencer the relation between the function of memory and the structure of the brain, and explained how habit develops conscious into unconscious movement. Condillac even gives the same illustration as Hartley and Spencer, *viz.*, the case of a musician, the movements of whose fingers have at first to be carefully watched and guided, but, at length, become so automatic that a person can perform on a musical instrument while simultaneously attending to some other work (p. 75).

Condillac's Frankenstein was not endowed with innate ideas, and so far his teaching was in accordance with that of modern psychology. But Condillac's method left no place for inherited tendencies, the results of accumulated ancestral modifications, which play, according to modern evolutionists, such an important part in psychic development. It will be found throughout this work that the author has been so intent in crediting modern psychologists with obligations to Condillac that he has taken little note of the many and vital distinctions which separate the psychology of the eighteenth from that of the nineteenth century. If we follow him in taking Condillac and Spencer as typical representatives of psychologists past and present, it is easy to show that a vast difference separates their procedure. The method of each is *synthetic*, but synthesis with Condillac is something quite different from synthesis with Spencer. With Condillac synthesis is the accretion and aggregation of simple elements—as of each sense in his famous statue; on the other hand, with Spencer synthesis is the process of tracing differentiation of function—the organisation and specialisation of the parts of an incoherent homogeneous totality.

*Essai sur quelques Théories Pessimistes de la Connaissance.* Par E. DE ROBERTY. Paris: F. Alcan, 1892. Pp. 164.

This essay is a rather smart attack on the position assumed by the Agnostics, which the author holds to be insincere and untenable. It is divided into five chapters dealing with various aspects of professed *nescience* or intellectual pessimism. Chapter i. is an examination of the critical agnosticism of Kant, whom the author regards as the pioneer of modern scepticism. The distinction between noumenal and phenomenal existence is held to involve three capital unwarrantable assumptions: (1) that there is a reality beyond that experienced by human beings; (2) that there may be modes of perception essentially different from the human; (3) that our cerebral constitution reveals the world under a false aspect (p. 32). Why, if all knowledge is admitted to be a *posteriori*, should ignorance alone be postulated as *priori*? Ignorance may be the limit, but it cannot be the source of knowledge.

In chapter ii. M. de Roberty assails the professed *nescience* of the Positivists, which, he says, is the hypocrisy of Materialism as the critical philosophy is the hypocrisy of Idealism. The Positivists, he asserts, begin by regarding the universe as a table of weights and measures, and end with an ontology more abstract than that of Hegel or Spinoza.

Chapters iii. and iv. are occupied with a criticism of the Monism of Herbert Spencer and the Evolutionists. The doctrine of Mr. Spencer's First Principles, instead of being Agnosticism, amounts, it is urged, to a systematic dogmatism pure and simple.

In conclusion, M. de Roberty thus states his own epistemological standpoint: "Consciousness appears as a natural stenography of the Cosmos. But just as ordinary stenography is composed of a series of abbreviated movements substituted for a series of movements on a larger scale, so Cosmic stenography constitutes a veritable Algebra of the universe, which it symbolises. In both cases, the substitution can only become possible 'par l'identité de nature des choses représentées et des symboles représentatifs'" (p. 147).

*Einleitung in die Moralphilosophie. Eine Kritik der Ethischen Grundbegriffe.* Von GEORG SIMMEL, Privat-docent an der Berliner Universität. Band I. Berlin: Verlag von Wilhelm Hertz, 1892. Pp. viii., 467.

Mr. Simmel's volume may be cordially recommended to all students of ethics who have got beyond the stage of text-books. To say that it is mature, luminous, well-arranged, and convincing would perhaps be going too far; but it is certainly acute, ingenious, subtle, suggestive, and almost uniformly interesting. The book is in four chapters. The first treats of the fundamental notion of "ought" regarded as an indefinable mode of thought or feeling, which reflexion on experience shows to be connected with a certain portion of the whole content of our thought, as the notion of real existence is connected with another portion. In the second chapter the notion of "Egoism," its antithesis to "Altruism," and the practical connexions and transitions between the two, are discussed, and "greatest possible realisation of will" is incidentally suggested as a fundamental principle of morality. In the third chapter the difficulties attaching to the current conceptions of Merit and Demerit—due to the peculiar implication of good with bad motives in either case—afford scope for the author's subtlety, and also for his tendency to paradox.

The longest and most important chapter is the last, on "Happiness," in which Utilitarianism is acutely criticised. Mr. Simmel, with sound instinct, lays stress on indifference to the *distribution* of happiness, as the characteristic of utilitarian systems which brings them—theoretically, if not practically—into conflict with common-sense. He suggests "maximisation of activity" as an end preferable to "maximisation of happiness". The chapter concludes with a critical discussion of five possible ways of conceiving the relation of virtue to the virtuous agent's happiness. Consideration is first given to the view that Virtue and Happiness are necessarily connected either (1) as two aspects of the same fact, or causally, Virtue being regarded as (2) cause or (3) effect of happiness. The author then discusses impartially the opposite Pessimistic view that adversity in this mundane sphere is the natural lot of the virtuous, and prosperity of the vicious. Finally, he considers (4) whether the connexion of Virtue and Happiness can be established for the individual in a more indirect way, either through the notion of Beauty, or—as is more commonly thought—through the intermediation of religion. The author's own conclusion is that we must abandon the effort to establish any simple and constant relation between the two notions or facts.—H. SIDGWICK. (Full notice will follow in due course.)



*Eine neue Darstellung der Leibnizischen Monadenlehre auf Grund der Quellen.*  
Von EDUARD DILLMANN. Leipzig: O. R. Reisland, 1891. Pp. x., 525.

Circumstances have delayed, and must still a little farther delay, notice of this elaborate piece of work. It is the production of a man who certainly has studied his author, and who also is of opinion that nobody before him has been able to lay hold upon the true Leibniz. Whether he is right where he departs from current interpretation of the philosopher (which he finds at its best in Zeller's *Gesch. d. deutschen Philosophie*), and whether he is in some of his main contentions as original as he gives out, are the questions to which some answer should be forthcoming. It is rendered unnecessarily difficult by his manner of citing Leibniz's works, and even unpardonably difficult by his always substituting a translation of his own for the philosopher's words. But there is too much evidence of labour and thought in the book for attempt at answer not to be made.

*Beiträge zur Geschichte der Philosophie des Mittelalters.* Ed. by Dr. CL. BÄUMKER.

Bd. i., Heft 1. Die dem Boethius fälschlich zugeschriebene Abhandlung des Dominicus Gundisalvi de Unitate. Ed. with commentary by Dr. P. CORRENS, Münster, 1891.

Bd. i., Heft 2. Avencebrolis (ibn Gebirol) Fons Vitæ, ex Arabico in Latinum translatus ab Johanne Hispano et Dominico Gundisalvi, ex codicibus Parisinis, Amploniano, Columbino, primum ed. CL. BÄUMKER. Fasc. i.

It is with the utmost satisfaction that those interested in the history of philosophical questions must hail the first fruits of the important work undertaken by Prof. Bäumker. The vague generalities with which it has been customary to treat the development of metaphysical reflexion in the Middle Ages have been gradually yielding to a more appreciative and better-informed estimate of the ideas of these times, but for full comprehension of the connecting links and most significant conceptions of mediæval thought the indispensable means, a collection of the relative texts with careful exegetical study of them, is as yet largely wanting. Prof. Bäumker's enterprise bids fair to fill up this lacuna in our knowledge of an important stage in the development of human culture, and we wish it every success.

Of the second of the two parts of his *Beiträge* now issued, containing portion (parts i. and ii.) of the *Fons Vitæ* of ibn Gebirol, a more detailed notice must be deferred until the whole text, with such historical and philosophical commentary as the editor gives, is before us. We call attention at present only to the importance of the work which Prof. Bäumker has on hand. Ibn Gebirol under the name or names (Avicbron, Avencebrol, Avicebrol and the like) given to him by the scholastic magnates, Albertus and Aquinas, had long been an object of interest to historians of philosophy, and even after the important contributions to knowledge of his personality and work made by Munk, and more recently by Guttmann, there still remained much to be done. The *Fons Vitæ* has been known to us only in the abridged version of Falagnera, from which Munk's translation in the *Mélanges* (1859) was taken. Now, for the first time, we shall have in its complete form a work that has exercised remarkable influence on the development of mediæval thought, and that discloses to us in a most interesting fashion the filiation of ancient and mediæval ideas. An account of the four MSS. used by the

editor is promised for the forthcoming number of the *Beiträge*. The work of editing seems to have been accomplished, so far, with the utmost fidelity and with excellent judgment.

The tract, *De Unitate*, which Dr. Correns presents to us, is in itself of much less significance than the *Fons Vita*, but it has a quantity of curious literary history attaching to it to which the editor in his commentary, occupying the greater portion of the number (pp. 12-49), does full justice and on which his labour sheds the clearest light. He is able to show that the tract bears manifest traces of an origin much later than Bæthius, to whom in a confused way it is in certain MSS. assigned, that it emanates from a Christian writer, and that its ideas in substance, and, in large part, in form of expression, are drawn from the *Fons Vita* of ibn Gebirol. And he gives the strongest grounds for the conclusion that the real author of the tractate was the well-known translator, Dominicus Gundisalvi, to whom in one MS. at least, that of Corpus College, Oxford, it is formally assigned.

*Das Schlechte als Gegenstand dichterischer Darstellung.* Vortrag gehalten in der Gesellschaft der Litteraturfreunde zu Wien. Von FRANZ BRENTANO. Leipzig: Verlag von Duncker & Humblot, 1892. Pp. 38.

The problem Professor Brentano essays to solve in this lecture is—Why should the depiction of Moral Evil, both in Comedy and Tragedy, be such a favourite theme with poets and dramatists? With regard to Comedy, he thinks the solution easy. Evil in its very nature is absurd and ridiculous, and the best material for Comedy is, therefore, found in all kinds of moral depravity.

In Tragedy, we have to seek deeper for the cause of the fascination exercised by the portrayal of the repulsive, the sad, and the sombre. Especially, as Professor Brentano points out, does tragedy delight in the triumph of injustice. Why is the innocent Antigone buried alive? Why should the virtuous Hippolytus meet such an untimely fate? Why should the ingenuous Romeo and Juliet be overtaken by such a mournful destiny? Professor Brentano regards the problem under discussion from three points of view. (1) The peculiar dignity of the subject. (2) The possibility of artistic treatment. (3) The popular taste (p. 19).

There is an element of sublimity in unmerited suffering which harmonises with the lofty aims of tragedy. The God of Tragedy is not a petty schoolmaster dealing promptly to each his due with rod and prize. Nemesis works in a wider sphere, and it is the business of the tragedian to throw into contrast the ephemeral tyranny of man and the eternal justice of fate.

Again, the tragic artist seeks for heroic types of human action and passion, and these he finds most readily in scenes of sin and sorrow.

Besides, variety is the soul of art, and it is the troubled waters of existence that best reflect the grandly picturesque.

Finally, as Professor Brentano urges, the tragedian must appeal to public sympathy. Before all things he must create an effect—he must keep his audience on the poise of expectation. Now nothing is better calculated to arouse gusts of sympathy than the representation of—

“The spurns

That patient merit of the unworthy takes”.

As a psychological explanation of the absorption of an audience by painful spectacles, Professor Brentano refers to Aristotle's dictum, that

time is a necessary element in tragedy. There must be a duration in which the plot develops, and painful incidents rivet the attention much more effectively than pleasurable ones, because they are accompanied by a continuous unsatisfied feeling of incompleteness. We might add that this is, in some degree, the impression the perusal of Professor Brentano's own lecture creates. The little that it was possible to say within such narrow limits of space is so well said that we wish he had said much more.

*La Religione e il Suo Avenire.* Secondo Eduardo Hartmann. By ADOLFO FAGGI. 1892. Pp. 91.

This is a clear and interesting account of Hartmann's religious views, treated with reference, as is inevitable, to his metaphysical and moral philosophy, and in its connexion also with previous and contemporary German thought, with the views more particularly of Hegel and Schopenhauer. Taking in succession Hartmann's views as to the origin of religion, the classification of religions, the essence and the future of religion, the writer very justly criticises his account of its origin as resting upon the very doubtful theory of 'emotion,' his principle of development and classification as not borne out by historical facts, and his central principle of redemption from *guilt* (not as with Schopenhauer from pain only), as involving the sense of responsibility, which, on the other hand, his deterministic philosophy can scarcely admit. Finally, the essayist concludes that the religious needs of the future will be met, not by Hartmann's 'Concrete Monism,' but by a widening and spiritualising of Christianity.

*Ricerche intorno ai Fondamenti di Pensieri.* By Professor DINO VARISCO. 1892. Pp. 109.

Setting as his problem "to formulate the most simple hypothesis by which to render explicable the fact of reasoning, starting from those data only which are admitted and received as immediate," Prof. Varisco finds that the 'immediate data,' viz., states of consciousness, being subjective, transitory, and individual, cannot be objects of reasoning, which is objective, involves the permanence of the object, and is general. They have, therefore, to be transformed into objects by abstraction, as Rosmini says, and the answer to the problem is "that the transformation of a pure state of consciousness into an object (of thought) is nothing but the turning upon it of the activity of consciousness; in other words, that this activity opposes to itself, i.e., sets to itself as object that upon which it turns". The result, therefore, of this inquiry into the nature of thought is that, given, on the one hand, states of consciousness, and, on the other, mental activity, the states will be worked up, some of them into objects, and some of them, as Prof. Varisco says, into the subject. The opposition between subject and object is thus transcended by reference to the activity which creates it, and the opposition which remains, between states of consciousness and activity, does not apparently trouble the writer. Whatever the psychological value of this account of the origin of the notions of subject and object, it will scarcely satisfy the metaphysical inquiry into their validity or into the nature of knowledge, not as process, but as product, or set at rest, as the writer seems to anticipate, the mind alike of realist and idealist.

## RECEIVED also :—

- J. Burnet, *Early Greek Philosophy*. London & Edinburgh: Adam & Charles Black, 1892. Pp. vi., 376.
- B. Bosanquet, *History of Aesthetic*. London: Sonnenschein, 1892. Pp. xiv., 502.
- A. Sidgwick, *Distinction and the Criticism of Beliefs*. London: Longmans & Co., 1892. Pp. viii., 269.
- J. H. Muirhead, *The Elements of Ethics*. London: John Murray, 1892. Pp. xi., 239.
- Sixteenth Annual Report of the Trustees of the Perkins Institution*. Boston: Wright & Potter Printing Co., Sept. 30, 1891. Pp. 408.
- G. S. Fullerton & J. M. Cattell, *On the Perception of Small Differences, with special reference to the extent, force and time of movement*. Philadelphia: University of Pennsylvania Press Publishers, 1892. Pp. 159.
- F. A. Aulard, *Le Culte de la raison et le Culte de être suprême*. Paris: F. Alcan, 1892. Pp. 371.
- L'Année philosophique*, Publiée sous la direction de F. Pillon. Paris: F. Alcan, 1892. Pp. 352.
- H. Schmidkunz, *Analytische und synthetische Phantasi*. Halle-Saale: C. E. M. Pfeffer, 1889.
- A. Oelzelt-Newin, *Ueber sittliche Dispositionen*. Graz: Leuschner & Lubensky, 1892. Pp. 92.
- Anon, *Von der Naturnotwendigkeit der Unterschiede menschlichen Handelns*. Berlin: Verlag des Bibliographischen Bureaus, 1892. Pp. 46.
- F. de Sarlo, C. Bernardini, *Ricerche sulla circolazione cerebrale durante l'attività psichica*. Reggio nell' Emilia: Stefano Calderini e Figlio, 1892. Pp. 76.

## VIII.—PHILOSOPHICAL PERIODICALS.

THE PHILOSOPHICAL REVIEW.—Vol. i, No. 2. Prof. A. Seth—Psychology, Epistemology, and Metaphysic. [A careful examination of the ground upon which various branches of philosophy are assigned as subjects of inquiry to Erkenntnisstheorie.] Prof. W. James—A Plea for Psychology as a Natural Science. [A reply to Prof. Ladd's reflexions on the physiological point of view in Psychology. Prof. James prefers a psychology that can cure mental disease to "seraphic insight into the nature of the soul," and this is the sort of psychology which "the biologists, nerve doctors, and psychical researchers are surely tending, whether we help them or not, to bring about".] Benj. Ives Gilman—On some Psychological Aspects of the Chinese musical system. [The conclusion of paper based on most careful and exact collation of facts. Notable for the ingenious application of the phonograph for the purposes of a closer study than is otherwise possible even with the most long-suffering and obliging native musicians.] Discussion, Reviews, &c. —Vol. i, No. 3. Prof. H. Calderwood—Herbert Spencer's Animal Ethics. ["Animal necessities we can see clearly; animal benefits we can reckon up accurately; but animal ethics we cannot find even in faintest outline."] Prof. J. Macbride Sterret—The Ultimate Ground of Authority. ["The immanent formative and life-sustaining power in all the current phases of Educative authority" is held to be "the eternal Reason, the goal and the starting-point of man's true history".] D. G. Ritchie—What is Reality? [Maintains in a clear and attractive manner the ultimate identity of Thought and Being. "A thing really is—that way of thinking about it which fits it into its place in an intelligible system of the universe." The author's argumentation does not seem to justify this conclusion. What he has really proved is rather that a thing really is—*what it must be thought of as being* in that way of thinking about it which fits it into its place in an intelligible system of the universe.] B. C. Burt—Natural Science and the Philosophy of Nature. [The function of the philosophy of nature is "the transformation of the formulæ of natural science into those of thought". "For the philosophy of nature the 'law' of the 'conservation of energy' instead of being merely 'given' as a general 'fact,' or rather, perhaps, as a postulate, is a self-evident, identical proposition, since energy, and energy alone, *is* being in activity, energy." This illustration is certainly an unfortunate one, whatever may be thought of the general view here advocated.] Prof. J. E. Oliver—A Mathematical View of Free Will. [Motives and volitions. "cannot so conspire with or oppose the actual physical changes or motions of the moment as to 'do work,' but they can produce deflexion or transference of an energy to whose potential they do not contribute," being *quasi-perpendicular* to all physical forces. An attempt is made from this point of view to rebut the ordinary objections to Free Will.] Discussions, Reviews, &c.

INTERNATIONAL JOURNAL OF ETHICS (April, 1892).—President Andrews, of Brown University, writes on 'Economic Reform short of Socialism'. The article, as might be expected from its title, is economic-political rather than ethical. Miss Gilliland writes on 'Pleasure and Pain in Education,' from the point of view of one who "calls the end of life self-realisation". Professor Maurice Bloomfield writes interestingly on

'The Essentials of Buddhist doctrine and Ethics,' and Mr. Mackenzie concludes his lecture on 'The Three Religions'. The longest article is a careful account of the Analysis and Growth of Conscience, by Dr. Starcke of Copenhagen, who views conscience as "a sensibility to what others have good reason to think about us" in the way of praise or blame: a good reason being explained to be "one founded upon the real fully perceived character of our actions". The reviews are numerous and interesting.

THE CRITICAL REVIEW OF THEOLOGICAL AND PHILOSOPHICAL LITERATURE.—Vol. ii., No. 2. Prof. A. Macalister discusses Prof. Max Müller's lectures on *Anthropological Religion*. Dr. Macalister forcibly points out that the "curious blend of Agnosticism and Christianity set forth . . . is a religious system with a new phraseology," and he calls attention to the defects of this view from the orthodox standpoint. Prof. James Robertson's *Early Religion of Israel* is reviewed by Prof. Davison. This work is an excellent instance of the application of logical processes to theological doctrine and critical inquiry. Its method, backed as it is by wide knowledge of the facts, serves to illustrate the necessity for careful sifting of premisses ere accepting conclusions, which appear to be well founded, on simple authority. Perhaps the most useful article is that on Rabbi Guttmann's *Das Verhältniss des Thomas von Aquino zur Judenthum und zur jüdischen Litteratur*. The author's thesis is that Thomas Aquinas was largely indebted to Jewish philosophy and theology. He elaborates this in three main sections: (i.) Thomas Aquinas and Judaism; (ii.) the relation of Thomas Aquinas to the philosophy of Gebirol; (iii.) the relation of Thomas Aquinas to the religio-philosophic system of Maimonides. "The most interesting part of the discussion is that which deals with the relation of Aquinas to Maimonides. The latter was an ardent disciple of Aristotle. Early in the thirteenth century the philosophy of Aristotle became popular among the Christian schoolmen. And the problem before Maimonides and Thomas was practically the same—to harmonise Aristotle and the Bible." When Thomas does not accept Maimonides' conclusion, "his opinions are referred to with the utmost respect". This book is at once fresh, valuable and scholarly. The number concludes, as usual, with an admirable list of "Selected Books," and articles from the leading magazines, in the departments of philosophy and theology.

THE AMERICAN JOURNAL OF PSYCHOLOGY.—Vol. iv., No. 3. The opening paper by Dr. W. Noyes "On Certain Peculiarities of the Knee Jerk in Sleep in a Case of Terminal Dementia" presents no facts of particular psychological value, but points toward future investigations which may be interesting. Dr. Noyes found that under certain conditions the knee jerks fell into groups which seemed to correspond to some extent to the Traube-Hering curve of vaso-motor activity. Should this correspondence be established, he hopes to throw light on the hitherto baffling question of whether or not functional activity of the central nervous system varies rhythmically with the contraction and dilatation of its vascular system. T. L. Bolton writes on "The Growth of Memory in School Children," his conclusions being drawn from observations made on pupils of the public schools in Worcester, Mass. Prof. Jastrow contributes his second series of "Studies from the Laboratory of Experimental Psychology of the University of Wisconsin," opening with a "Study of Zöllner's Figures and other Related Illusions". As Prof. Jastrow contents himself with detailing the facts of his investigations we can do no more than say that he found that all the illusions observed

seemed to have the following principle as a basis, *viz.*, that we tend to regard the direction of the sides of an angle as deviating toward the direction of the angle. The explanation of the principle itself is yet to be supplied. A real service has been rendered however in collecting the most typical of these illusions and reducing them to something like system. "A Study of Involuntary Movements" describes an attempt to register the movements made by the hand while the attention was engaged in another direction, *e.g.*, naming a series of colours, reading from a printed page held in different positions, counting the beats of a metronome, &c. Some rather striking illustrations are given of the well-known fact that our involuntary movements are in the direction of the form of attention, their extent depending largely of course on the favourableness of the anatomical conditions for executing such movements. "Observations on the Absence of the Sense of Smell" present no new facts, and the three remaining studies on "Classification-Time," "Finding-Time," and "Some Anthropometric Tests," are of minor interest. Prof. Jastrow's "studies" are all made with the assistance of his pupils and are proofs of the account to which such work can be turned. Alexander Fraser writes on "The Psychological Foundation of Natural Realism," and reviews of psychological literature, the continuation of Dr. Sanford's laboratory course letters, and notes close the number.

PHILOSOPHISCHE STUDIEN.—Bd. viii., Heft 1. W. Wundt—Hypnotismus und Suggestion. [An elaborate article (85 pages), which will, it is to be hoped, have a salutary effect. In the introduction, the place which hypnotism is usurping in modern psychology and the trend of thought which this implies are remarked on. The first section deals with the phenomena of hypnosis, so far as their characterisation is necessary for psychological treatment. In that following, a psychological theory of hypnotism and suggestion is given. The author follows Bernheim's principle of bringing the facts of hypnosis into relation with other established facts of pathological and physiological psychology, though Bernheim's hypothesis is rejected as being too one-sidedly physiological. In the third section, the claims of suggestion to be recognised as a method in experimental psychology, and in the last the practical (medicinal) significance of hypnotism, are discussed. It is impossible here to reproduce the contents of the paper: a translation would be extremely valuable.] H. Höfding—Zur Theorie des Widererkennens: eine Replik. [A series of notes on the recognition-theories of James, Lehmann, and Wundt. *Introductory*: (1) In immediate reproduction we have not merely a sensation, but a sensation with the consciousness that it is known. This is the simplest case of repetition or practice. (2) On the fact of *i. r.* all are agreed; it is the explanations of the process which differ. *Theory of i. r.*: (a) The formal question. Höfding uses the law of parsimony to support his view, as Lehmann had done. A phenomenon is only explicable by hypotheses which refer to its connexion. For Lehmann, this connexion is with the laws of association, and the simplest and most valid law is that of contiguity; hence his explanation of *i. r.* For Höfding, the connexion is that of repetition; *i. r.* is a case of practice. (b) Material side; answering of objections. (1) That unconscious ideas are at work in the process of *i. r.* Höfding denies. Lehmann's smell-experiments showed that a scent which is known, but not determinable, may often be determined by the experimenter's questioning, *i.e.*, there are ideas beneath the threshold, Lehmann maintained, which are rendered effective by the law of contiguity. Höfding replies rightly that the questions can arouse fresh reproductions, which are



adequate to the explanation of the results. Lehmann's accentuation of naming as an aid to reproduction (experiments on shades of grey) is also called in question; practice in naming is practice in the reproduction of the impression itself. (2) James is more correct than Lehmann or Wundt, in that he dispenses with unconscious ideas, only speaks of a tendency of the known to reproduce, and accents practice as a factor in the explanation of i. r. James is incorrectly said to contradict himself as regards similarity-associations. (3) That Wundt uses the feeling of i. r. as explanation of the process is in agreement neither with Lehmann's experiments nor Höfding's facts. There is a feeling of pleasure involved, but that is not all. But is i. r. to be explained by contiguity or similarity, or by association at all? Repetition is treated by Höfding objectively, throughout. The subjective moment is, according to Wundt, feeling; according to Lehmann, ideas which lie beneath the threshold of consciousness. Höfding previously had recourse to the notion of fusion (of a disposition with the repeated impression); this is Lehmann's view, with the similarity-difference.] J. Merkel—Theoretische und experimentelle Begründung der Fehlermethoden, ii. [Second part of the writer's consideration of the psychophysical error-methods. The whole is a very notable contribution to the technical literature of psychophysics.] E. B. Titchener—Zur Chronometrie des Erkennungsactes. [The time required for the 'recognition' of a colour averages  $30\sigma$ ; for that of a printed letter or short word,  $50\sigma$ .] O. Külpe u. A. Kirschmann—Ein neuer Apparat zur Controle zeitmessender Instrumente. [The authors describe a new control-hammer, designed by Wundt; and publish the results of a thorough-going examination of the variable errors of the Hipp chronoscope (old pattern), carried out by its aid. It would, perhaps, be an improvement, if the hammer fell through its own support, coming to rest, e.g., on a padded surface at an angle of  $45^\circ$  below the horizontal; in its present form the shock of its fall cannot be good for the chronoscope.]

ZEITSCHR. F. PSYCH. U. PHYS. D. SINNESORGANE.—Bd. iii., Hefte 2 u. 3. E. Brodhun—Ueber die Empfindlichkeit des grün-blinden und des normalen Auges gegen Farbenänderung im Spektrum. [Violetwards of the E-line the green-blind eye is as sensitive to colour-change as the normal eye, or may even exceed it in sensitivity; redwards the normal eye is by far the more sensitive.] H. v. Helmholtz—Kürzeste Linien im Farbensystem. [The third in the series of articles in which Helmholtz seeks to explain difficulties in his theory of colour-vision by an extended application of Fechner's law. The present paper, like so much more of the author's work, is likely to escape challenge by reason of its abstract mathematical form.] Th. Lipps—Die Raumanschauung und die Augenbewegungen. [A lengthy polemic against Wundt's theory of the part played by eye-movements in the building up of our perception of space, following upon the author's article "Ästhetische Faktoren der Raumanschauung" in the *Beiträge zur Psych. u. Phys. d. Sinnesorgane*. The discussion falls into three parts: (1) the field of vision and field of view; (2) the third dimension; (3) judgments of size and distance. Many of the points raised deserve experimental consideration. On the other hand, there is some loose writing, especially in the second section.] Th. Wertheim—Eine Beobachtung über das indirekte Sehen. [The disappearance or darkening of objects, the neighbourhood of which is strongly and suddenly illuminated, takes place both in direct and indirect vision; the brightening of objects, whose neighbourhood is suddenly darkened, is only observable in direct vision.] G. Sergi—Ueber einige Eigentüm-

lichkeiten des Tastsinns. [Touch-sensations proper have no after-effect, nor are successive stimuli summed to a single sensation; pressure-sensations show both phenomena. There is no latency-period for sensations occasioned by touch-stimuli. Pure touch-sensations cannot be evoked on the *glans penis*.] K. L. Schaefer—Beiträge zur vergleichenden Psychologie, i. [A number of invertebrate animals were rotated in the horizontal plane. A rotation of the body in the opposite direction was observed in the case of dung-beetles, ants, house-flies, and earwigs, if they were in active movement at the time of commencement of the experiment. Wood-snails displayed this tendency to inverse movement (which the writer inclines to regard as reflex in character) only sometimes, and caterpillars of the cabbage-white variety not at all. No giddiness followed the rotation.] J. Rehmkne—Gegenantwort auf die Erwiderung von O. Flügel. Litteraturbericht. Hermann Aubert.

ZEITSCHRIFT FÜR PSYCHOLOGIE U. PHYSIOLOGIE DER SINNESORGANE.—Bd. iii., Heft 4. J. von Kries—Ueber das absolute Gehör. [Interesting though rather unsystematic notes upon absolute tone-memory. This is not to be confused with relative tone-memory, for which a normal tone is necessary (*cf. Phil. Stud.*, iii. 534): it is only different in degree from the almost universal capacity of distinguishing between a high and a low tone. The author finds (1) that so much musical training is needful, that the recognised tones can be named; (2) in all other respects the absolute tone-memory is independent of musical practice; (3) it does not imply an otherwise especially good ear; (4) it depends on the duration and intensity of the clangs; (5) it is best for the middle tone-region; (6) it is in most cases dependent on the colour of the particular clang, though not determined by the special instrument which its possessor may chance to play. Prof. v. Kries gives an analysis of the association-processes involved; and attempts, without much success, to explain (6).] L. Matthiessen—Die zweiten Purkinjeschen Bilder im schematischen und im wirklichen Auge. [Helmholtz had used the Purkinje mirror-images to determine the curvature of the crystalline lens, on the assumption that the latter represents a homogeneous, isotropic medium. The writer deals with the real lens, as an anisotropic body, with a refraction-index which varies from layer to layer. He gives determinations for the human and horse's eye.] Besprechungen. [A detailed review of Prof. James' *Principles*, by A. Marty.] Litteraturbericht.

PFLÜGER'S ARCHIV F. D. GESAMMTE PHYSIOLOGIE.—Bd. li., Heft 2. A. Kreidl—Beiträge zur Physiologie des Ohrlabyrinths auf Grund von Versuchen an Taubstummen. [The author of this research has done good psychological service, if not always with adequate psychological knowledge, by the proofs here adduced in confirmation of the theory that the labyrinth of the ear is to be regarded as the organ of the static sense. A large body of experiments on animals points to the fact that the semicircular canals are the sense-organs for the perception of rotation of head and body. The present investigation was undertaken partly as a continuation of Prof. James' work (the results of which are not wholly trustworthy, as depending on the statements of the patients themselves), partly in consequence of a suggestion of Breuer's. It is divided into a historical introduction and three parts. (1) *Eye-movements*. According to the theory of Mach and Breuer the compensatory eye-movements which normally follow rotation of the head should be absent in a large percentage of deaf-mutes. About 50 p.c. of Kreidl's reagents showed no eye-movements. Now Myding found in 56 p.c. of his deaf-

mute dissections a pathological condition of the canals. This number coincides admirably with that obtained by Kreidl. (2) *Judgment of perpendicularity*. Breuer regards the otolith-apparatus as the organ for our perception of acceleration of movement of the head and body, and of their position. Kreidl's reagents were rotated in a circle of 2 m. radius, with a rapidity of 11 revolutions in the 1'. Of the 50 p.c. mentioned in § 1 as showing no eye-movements, 21 p.c. moved a clock-hand to the perpendicular during rotation with approximate correctness; in the other cases the hand showed a more or less normal deflexion. Dissection proves that the otolith-apparatus of deaf-mutes is less often impaired than the canals; and we possess, of course, other aids to a judgment of direction. (3) *Locomotion*. Of eleven deaf-mutes—all with abnormal canals, and seven (conjecturally) with abnormal otolith-apparatus—examined for balancing reflexes, and walking and standing with closed eyes, only one (perhaps two) gave normal results. Here, too, the injury to the labyrinth must be regarded as cause of the phenomena.]

ARCHIV FÜR GESCHICHTE DER PHILOSOPHIE.—Bd. v., Heft 3. E. Zeller—Noch ein Wort ueber die Abfassungszeit des platonischen Theätet. [Rejoinder in the discussion that has been going on between the author and E. Rohde as to the date of the *Theätetus*. Against Rohde, and also incidentally against F. Dümmler, Zeller still stands out for his original date of 391 B.C. The argument here turns almost exclusively on the "twenty-five ancestors" passage.] M. Consbruch—'Επαγωγή und Theorie der Induction bei Aristoteles. [A very noteworthy examination of Aristotle's wavering conception of Induction, in the light of developed modern doctrine.] B. Seligkowitz—Causa sui, causa prima et causa essendi. [With special reference to Schopenhauer's criticism of Spinoza.] W. Dilthey—Auffassung u. Analyse des Menschen im 15 u. 16. Jahrhundert. [Concluding half of comprehensive review begun in a former number. The present division is devoted to the work of the Teutonic mind, from Erasmus to Sebastian Franck.] Jahresberichte.

VIERTELJAHRSSCHRIFT DE WISSENSCHAFTLICHEN PHILOSOPHIE.—Bd. xvi., Heft 2. A. Riehl—Beiträge zur Logik, ii. [Discusses the different forms of judgment and of inference. The guiding clue is furnished by the distinction between conceptual propositions, which express thought-necessity, and judgments proper, which affirm real existence. Conceptual propositions, such as those of mathematics, are always universal by their very nature. The article is interesting and valuable.] Ernst Platner's Wissenschaftliche Stellung zu Kant in Erkenntnistheorie und Moralphilosophie. [Platner placed the ground of the necessity of the categories in the nature of things in themselves. He held that they can function as forms of a non-sensuous cognition. He attacks the Kantian separation of sense and understanding, and he thinks that Kant has entirely failed to prove the objective validity of the categories. Kant has, according to him, made no real advance on Hume; for the laws of association are just as deeply rooted in our intellectual constitution as the categories. He combats the doctrine of the Dialectic, professing his inability to see why knowledge should be restricted to sensible experiences and nothing left in the domain of Reason but ideas without objects. The antinomies, he urges, involve no self-contradictions of Reason, but rather inconsistencies between the demands of Reason and of Imagination. In Ethics he charges Kant with confusing the two essentially distinct conceptions of Perfection and of Good. Perfection lies in the observance of the moral law. But happiness is the supreme good for the

sake of which perfection is pursued.] G. Frege—Ueber Begriff und Gegenstand. [A defence of the writer's view of concepts as never being things but always predicates of things.] R. Willy—Bemerkungen zu Richard Avenarius' *Kritik der reinen Erfahrung*. [An interesting résumé and criticism.] Anzeigen, &c.

PHILOSOPHISCHES JAHRBUCH.—Bd. v., Heft 5. Victor Cathrein—Socialethik oder Individualethik. [In this article the question is discussed whether Moral Philosophy is concerned most directly with Society, or with the Individual. The author considers the tendency to base morality on the needs of Society and not of the Individual as an outcome of modern science.] Wolff—Lotze's Metaphysik. [The continuation of a criticism of Lotze's doctrines in which Dr. Wolff finds truth and error, sound precepts and faulty applications, attractive and worthless core intermingled.] Pfeiffer—Der Ästhetische Contrast in den Erscheinungen des Erhabenen. [This concludes an able and interesting series of papers on contrast as an element of the sublime.] C. Ludwig—Der Substanz-begriff bei Cartesius im Zusammenhang mit der scholastischen und neueren Philosophie. [Compares the dogmatic conception of substance framed by Descartes with the sceptical presentation of the same idea in Modern Metaphysics.] Gutberlet—Die Willensfreiheit und die physiologische Psychologie. [Professes to approach the free will controversy from the most modern standpoint of physiological psychology. The reasoning is acute throughout.] Rezensionen und Referate.

ZEITSCHRIFT FÜR PHILOSOPHIE UND PHILOSOPHISCHE KRITIK.—Bd. c., Heft 1. A. Wreschner—Ernst Platners und Kants Erkenntnisstheorie. [Discusses the influence of Kant as shown in the differences between the first and second, and between the second and third, editions of the Aphorisms.] G. Frege—Ueber Sinn und Bedeutung. [The "Bedeutung" is the reality, signified by a mental representation: the Sinn is the special mode in which this reality is represented—the point of view from which it is regarded.] Nikilaas von Seeland—Ueber die Einseitigkeit der herrschenden Krafttheorie. [Tries to show that the phenomena of life are inconsistent with the conservation of energy as ordinarily understood.] Rezensionen, Bibliographie, &c.

REVUE PHILOSOPHIQUE.—17<sup>e</sup> Année, No. 4. Charlton Bastian—Les processus nerveux dans l'attention et la volition. [The process of attention is essentially sensorial although inseparable from motor concomitants. The phenomena of volition are a simple transcription into action of the intellect. Every conception of the will as a separate entity is an illusion, a kind of psychological phantom.] F. Paulhan—La Responsabilité. [In morbid or abnormal states characterised by a more or less marked dissolution of the personality, a more or less great de-coordination of the psychic systems, the diminution of responsibility is proportional to that de-coordination, of which in each case it is important to determine the degree.] Pierre Janet—Le Spiritisme Contemporain. [An amusing account of the conquests of theosophy in the realm of spiritualism. "It is not always possible to speak seriously of things which are not serious."] Analyses et comptes rendus.

RIVISTA ITALIANA DE FILOSOFIA.—Anno vii. (March and April). P. L. Cecchi—Filosofia della storia. [Seeks to show the inadequacy of evolution, which the author conceives as a corollary of association, to

explain the movement of thought and the introduction of new conceptions. Immediate creation is regarded as a better explanation.] Prof. D. V. Laureani—La legge morale. [Suggests, after a brief survey of the views of Kant, Mill and Spencer, a theory of the moral law as based upon original altruistic tendencies, deduced by reflexion, and receiving their character of necessity and universality from the reason.] R. Bobba—Di alcuni commentatori italiani di Platone (cont.). [Deals with Patricci, Erizzio and Pano.] Bibliografia, &c.—Anno vii. (May and June). V. Benini—Il momento dell' osservazione. [Discusses the nature and conditions of 'inspiration' in its relation to voluntary intellectual effort.] Prof. Ferri—Della coscienza sensitiva. [Continued from the March-April No. of 1891, and treating of "Perception". Rejecting the Wundtian distinction between perception and apperception as being merely a distinction of degree, Prof. Ferri understands by perception the all-pervading synthetic activity, which is distinct from, though it always accompanies, sensation. He is concerned in this paper with establishing the fact of such activity, as against the associationists, and with showing the part it plays in the elaboration of the sense-given material. Starting from the primary opposition of activity and passivity, he rather unfortunately revives to express it the terms, subjective and objective, and with them some old ambiguities. While the subjective side has its principle of explanation in the synthetic activity of perception, on the objective side we are referred back to the laws of motion, and from the psychological opposition between activity and passively given content we are brought to the extra-psychological opposition between "mind and matter".] R. Bobba—Di alcuni commentatori italiani di Platone. [The final paper dealing with Antonio Conti.]

## IX.—NOTES.

### THE PSYCHOPHYSICS OF MOVEMENT.

The writers of this note have recently published a monograph<sup>1</sup> describing some work on which they have been engaged during the past three years. It contains a discussion of more than 20,000 judgments, illustrated with many tables and diagrams. The detailed results are too extended and technical for any but special students of psychophysics. A summary may, however, be of interest to a larger circle of readers.

#### I. Psychophysical Methods.

The method of the just noticeable difference—in which an observer finds a difference which he can just perceive—is not satisfactory. If the observer simply choose a difference, which he thinks he can always or usually perceive, the result is without objective criterion. Indeed, our experiments show that those who think they can perceive the smallest difference are apt to be the worst observers. If the percentage of mistakes made by the observer be recorded, this method becomes a case of the following. But the "just noticeable difference" is not a convenient difference to use in the method of right and wrong cases. If the percentage of right cases be very large, a single chance variation greatly affects the average. If there be no mistake, we have, indeed, found a difference which can be perceived, but not the difference which can just be perceived, nor any other quantity which can be used as a measure of discrimination. If the just noticeable difference be interpreted by the observer as a difference apparently equal to some other difference, the method is reduced to that of estimated amount of difference.

The method of right and wrong cases—in which two stimuli nearly alike are presented to an observer, and he is required to say which seems the greater—is the most accurate of the methods. It requires a considerable number of experiments—at least 100,—and the number must be the greater the less practised the observer. The method is consequently not well suited for provisional, anthropometric, or clinical purposes. The percentages of right cases obtained do not directly measure the fineness of discrimination. The probable error, that is, the difference with which an observer is right 75% of the times, is the most convenient measure of discrimination. The probability integral may be used to calculate the probable error when the amount of difference is known, and the percentage of right cases is greater or less than 75. It is better not to allow the observer to give doubtful as his decision, but the confidence felt by him in its correctness may be recorded with advantage. The observer is more apt to be right than wrong, even when he feels little or no confidence in his decision. Some observers are not confident unless they are, in fact, right, while others are often confident when they are wrong.

The method of average error—in which an observer makes one stimulus as nearly as possible like another—is, in many cases, the most convenient of the methods. It is closely related to the preceding, as the probable error can be found either from the average error or from

<sup>1</sup> *On the perception of Small Differences, with special reference to the Force, Extent, and Time of Movement.* University of Pennsylvania Press, Philadelphia.

the percentages of right cases. The probable error of the just noticeable difference, or of an estimated amount of difference, may also be determined, and the several methods thus combined. The error obtained by the method of average error is complex, being partly an error of adjustment and partly an error of perception. These errors may be separately determined by requiring the observer to judge the stimuli by the method of right and wrong cases after they have been adjusted. The average error may be analysed into a constant and a variable error. The distribution of the errors tends to follow the probability curve. This method can be used to special advantage when only a few experiments are made, as a result is reached more quickly than by the method of right and wrong cases.

The method of estimated amount of difference—in which an observer judges the quantitative relations of stimuli as in making one difference equal to, or double another—gives variable results. The observer probably does not estimate quantitative relations in sensation, but quantitative differences in the stimuli learned by association. It is consequently an open question whether the differences in sensation are qualitative or quantitative.

Great care should be taken in psychological experiments to keep all the conditions constant, except the variable to be investigated. The observer should not know the results of preceding experiments, nor the objective relations of the stimuli. Experiments should not be rejected because they make the averages less accordant. The results of experiment depend on accommodation to the conditions of experiment as well as on differences in senses or faculties, and these factors should be separately studied.

## II. *The Error of Observation and the Magnitude of the Stimulus.*

Weber's law, according to which the least noticeable difference is proportional to the magnitude of the stimulus, does not hold for the extent and force of movement, as the least noticeable difference (or the error of observation) increases more slowly than the stimulus. Fechner's law, according to which the sensation increases as the logarithm of the stimulus, does not hold, as it rests on Weber's law, and on assumptions which are probably incorrect. As there is no logarithmic relation between mental and physical processes, the psychophysical, physiological, and psychological theories put forward to account for it are superfluous.

When amounts of difference in movements are estimated, the stimuli tend to be judged in their objective relations, and not as the logarithm of these. The results obtained by the method of right and wrong cases, and by the method of average error, determine the error of observation. This is a physical quantity. Its correlation with other physical quantities (for example, the magnitude of the stimulus) depends on physiological and mental conditions, and offers an important subject for psychological research. A mental quantity is not, however, directly measured. The error of observation usually increases as the stimulus is taken greater, but more slowly than in direct proportion to the magnitude. If the errors made in observing two stimuli of the same sort be combined, they will not be twice as large as the average error, but will equal the average error multiplied by the square root of two. This results both from theory and from our experiments. Consequently if two magnitudes, say two seconds, be observed continuously, the combined error in observing the two seconds would tend to equal the error in observing one second multiplied by the square root of two, and generally the error in observing a magnitude, extensive or intensive,



would increase as the square root of the magnitude. The summation of errors in this manner seems to account perfectly for the usual increase of the error of observation ("just noticeable difference") with larger magnitudes. The error would increase as the square root of the magnitude, if each fraction of the magnitude, physically equal, were, in fact, subject to the same error of observation. In actual perception this would seldom or never be the case, but most of our experiments give an error of observation more nearly proportional to the square root of the magnitude, than directly proportional to the magnitude (Weber's law). We, therefore, substitute for Weber's law the following: *The error of observation tends to increase as the square root of the magnitude, the increase being subject to variations whose amount and cause must be determined for each special case.*<sup>1</sup>

### III. The Extent of Movement.

Experiments on the extent of movement were made by measuring the accuracy with which movements of the arm can be adjusted. The four distances chosen were 100, 300, 500, and 700 mm. Time was kept by a seconds pendulum, one second being allowed for each movement, and one second for the interval between the two movements to be compared. Experiments were made by the four psychophysical methods on one observer, and by the method of average error upon two others.

The attempts to mark off a distance just greater and one just less than 500 mm. resulted in, respectively, 589.4 and 477.2 mm. The distance marked off in separate experiments was highly variable. Even for groups of 100 experiments the average, just noticeable difference, varied, for the attempt at just greater, between 60.1 and 21.5 mm., and for the attempt at just less, between 37.7 and 4.8 mm. In striking contrast with these figures was the slight degree of variation in the variable error and its variation. For instance, where in two groups of 100 experiments each, the just noticeable difference was 60.1 and 21.5 mm., the corresponding variable error was 9.8 and 8.9. The highly variable character of the just noticeable difference makes it of small value in psychophysical experiment.

By the method of estimated amount of difference three kinds of experiments were made. An attempt was made to halve 500 mm., to double 300 mm., and to find the mean between 300 and 700 mm. The results of these experiments were all contrary to Fechner's law, the attempt to halve 500 mm. resulting in a distance of 305.2, the attempt to double 300 giving one of 560.1, and that to find the mean between 300 and 700 giving 512.4. In these experiments the variable error was, in relation to the whole extent of the movement made, greater than in the experiments by the method of just noticeable difference.

The experiments by the method of average error consisted in attempts to measure off on the scale 100, 300, 500, and 700 mm. The results of the experiments on the first observer showed a marked tendency to over-estimate the shortest distance, while the longest was under-estimated. The variable error for the four movements was, respectively, 5.3, 8.8, 9.5, and 8.9; or about  $\frac{1}{16}$ ,  $\frac{1}{14}$ ,  $\frac{1}{15}$ , and  $\frac{1}{16}$  of the stimuli. The experiments on the other two observers gave the same general results. Their combined variable errors were about  $\frac{1}{12}$ ,  $\frac{1}{13}$ ,  $\frac{1}{17}$ , and  $\frac{1}{13}$  of the stimuli. Thus the variable error increases much more slowly than the stimulus, and Weber's law does not obtain. The error increases more nearly as the square root of the stimulus, but more slowly, being actually smaller for 700 than for

<sup>1</sup> One of the writers (G. S. F.) does not fully assent to the subject-matter of this section.

500 mm. This is probably because the distance was nearly the limit which could be reached, and the observer was helped by the strain.

In the experiments by the method of right and wrong cases the stimuli used were 500 and 510 mm. When the second stimulus was the greater, 75% of the judgments were right, and when the second was the less, 71.8%. The probable error (the difference which could be distinguished, 75% of the time) is 11 mm. The first movement was slightly under-estimated, the constant error being .7. The degree of confidence expressed by the observer was a fair index of the objective correctness of his judgment.

#### IV. *The Force of Movement.*

A dynamometer may be used to advantage in studying the discrimination of the force of movements, but the clinical dynamometers are too inaccurate for scientific experiment. In making experiments on movement the observer can himself give the first or normal movement as well as the second or judgment movement, and the two movements will thus be made and perceived under like conditions.

"The just noticeable difference" in the force of movement varied greatly, not being proportional to the error of observation, but more accordant results are obtained if the probable error be found by taking into account the number of mistakes made by the observer. The average error of the just noticeable difference may also be used as a measure of discrimination. The just noticeable differences (for two observers) for about 2, 4, 8, and 16 kg. were respectively about  $\frac{1}{6}$ ,  $\frac{1}{4}$ ,  $\frac{1}{3}$ , and  $\frac{1}{2}$  of the stimulus. The variable errors of observation were respectively .12, .20, .37, and .41 kg., and the probable errors obtained by taking the percentage of the errors into account were respectively .14, .26, .40, and .45 kg.

Experiments by the method of average error gave (for five observers) variable errors .19, .29, .43, .46, kg. for the magnitudes 2, 4, 8, and 16 kg. respectively. The worst of the five observers had an error about  $\frac{1}{4}$  larger than the best. Some observers are relatively better with the weaker, some with the stronger movements. There were considerable constant errors varying with different observers. The smallest magnitude was usually under-estimated, and the largest magnitude over-estimated. Neither the just noticeable difference nor the error of observation is a proportional part of the stimulus. Weber's law consequently does not hold for the force of movement. The error of observation is nearly proportional to the square root of the magnitude.

The error, when two movements are made as nearly as possible alike, is partly an error of perception, and partly an error of adjustment, and these two factors may be separated. The error of perception was, on the average, about twice as great as the error of adjustment, but the error of adjustment was relatively the smallest for the best observers. The errors in making two movements as nearly alike as possible tend to be distributed as required by the probability curve. The combined error obtained by adding algebraically the errors in pairs is nearly equal to the average error multiplied by the square root of two.

Experiments by the method of estimated amount of difference showed that the force of movements tends to be estimated in their objective relations, and not as the logarithm of these. The results are variable, and subject to large constant errors.

#### V. *The Time of Movement.*

Apparatus can be constructed which will measure accurately and conveniently the time either of a slow movement or of a quick blow.

When movements are discriminated, it is an advantage to let the observer adjust the time of the first as well as of the second movement. The error in judging the time of a movement (50 cm. in extent) with the arm, lasting about  $\frac{1}{4}$ ,  $\frac{1}{2}$ , or 1 sec., is nearly proportional to the magnitude, being (as the average of five observers) about  $\frac{1}{15}$  thereof. The error with the worst observers was about twice that with the best. With the quicker movements the observer judges chiefly by the force of the blow, and as force is discriminated more accurately than time, this may account for the error increasing more rapidly than the square root of the magnitude.

With  $\frac{1}{4}$  and 1 sec., when the time of the two movements seemed equal, the second was the slower. When two blows in succession are made as quickly as possible, the second is the quicker, and seems the quicker. Half a second seemed less than half of 1 sec., and more than double  $\frac{1}{4}$  sec.

The results obtained by analysing the error into an error of perception and an error of adjustment, and from the distribution of errors and summation of errors, were nearly the same as with the force of movement.

The time of the quickest possible blow (50 cm. in extent) varied (with four observers) from .085 to 1.81 sec. While the rate of movement varies considerably with different observers, its average variation under like conditions is small, for a good observer .005 sec. The time was about the same for the right and left hand, and the rate was nearly uniform. The rate of movement should be used in the study of diseases of the nervous system.

Within the limits investigated the extent of movements can be judged better than the force, and the force better than the time.

#### VI. *Lifted Weights.*

The probable error in discriminating lifted weights, weighing about 100 grams, varied (for nine observers) from 5 to 8.2 grams, the average being 6.2 grams. This is the difference which could be correctly distinguished three-fourths of the time. The difference which could be correctly given 99 times out of a hundred would be about 21 grams. The probable error is nearly the same, whether calculated from a large difference and large percentage of right cases, or from a small difference and smaller percentage of right cases.

The confidence felt by different observers in the correctness of their judgment varies greatly and is not proportional to their fineness of discrimination. The constant error can be calculated. In these experiments it varied from .5 to 6.8 grams. The second of the two weights seemed relatively the heavier to nearly all the observers. In judging the accuracy of discrimination of an observer, both variable and constant errors should be considered.

The probable error is not greatly altered when the manner of lifting the weights is altered. It becomes larger when the weights are lifted with different hands or up or down only. It is scarcely altered when one weight is lifted four times as high or four times as fast as the other.

#### VII. *Lights.*

In our experiments on lights, apparatus was devised to give the observer two sensations of light in succession, each lasting one second and one second apart. The conditions were thus similar to those in the experiments with lifted weights. The lights compared were as 100 to 110, 120, 130, and 140. The probable error (given in hundredths of the intensity of the stimulus) varied for nine observers, from 9.9 to 18.7 with an aver-

age of 13.9. Reckoning upon this basis, a difference to be correctly given 99 times out of 100 would have to be about 48, or nearly  $\frac{1}{2}$  the stimulus. This large figure may be due partly to the fact that the illuminated area on the retina was small and the intensity of the lights used not great; but it was probably chiefly due to the sensations being successive. We consider it an advantage to have the sensations successive, as the conditions can thus be kept constant, and sight can be compared with the other senses, muscular sense, hearing, &c. Different observers differed much in their degree of confidence, in the correctness of their judgment, and their degree of confidence was no indication of the relative fineness of their power of discrimination. For the same observer, however, the degree of confidence corresponded fairly well to the degree of objective accuracy. All the observers showed a tendency to under-estimate the second light, the constant error varying from 1.4 to 16.2. Under the conditions employed the muscular sense is about as again accurate as the sense of sight.

Memory for sensations may be studied by increasing the interval between the two stimuli to be compared, the probable error of an observer measuring his rate of forgetting. Observers remembered lifted weights and lights so well up to nine seconds, that their error of observation was scarcely increased. When the time was from 15 to 61 seconds the error was increased by about one-third. This is contrary to the common view, according to which we are supposed to forget most rapidly at first.

JAMES McKEEN CATTELL.  
GEORGE STUART FULLERTON.

#### CROOM ROBERTSON TESTIMONIAL.

Some months ago a proposal was made to mark Professor Robertson's retirement from the editorship of *MIND* by some expression of his contributors' regret and some token of their good-will. Seventy-four contributors responded to the call, and the total subscription amounted to £68. A gold watch and an albert chain and seal have been sent to Professor Robertson, accompanied by the following letter:—

"DEAR PROF. ROBERTSON,

"As contributors to *MIND* we deeply regret the circumstances that have compelled you to relinquish the arduous duties of Editor, which you discharged for sixteen years with such acknowledged success.

"We desire to place on record our sense of the great value of the services you have rendered to the study of psychology and philosophy by the steadfastness of your endeavours to maintain the high standard of excellence at which the original founders of the review aimed, as well as by your exemplary fairness towards all philosophical opinions, however diverse, that sought for reasoned statement in your pages. We desire to express not less warmly our recognition of the personal sacrifices of time and energy which you have unstintingly made, and our admiration of the candour, amiability and courtesy which rendered all our relations with you as Editor a source of unmingled pleasure to us.

"The volumes of *MIND* that have been published under your editorship will long remain a worthy memorial of your labours and may fitly afford you a solid basis for satisfaction in any retrospect of those past years. But we trust it will give you pleasure to accept from us the accompanying more personal memorial as some token of our affection for you, our esteem for your work, and our earnest hope for your continued health and welfare."

This letter was signed by the seventy-four contributors.